THE JOURNAL

OF THE

ANTHROPOLOGICAL INSTITUTE

OF

GREAT BRITAIN AND IRELAND.

FEBRUARY 12TH, 1884.

JOHN EVANS, Esq., D.C.L., F.R.S., *Vice-President, in the Chair.*

The Minutes of the last meeting were read and signed.

The following presents were announced, and thanks voted to the respective donors:—

FOR THE LIBRARY.

From PRINCE ROLAND BONAPARTE.—Collection Anthropologique du Prince Roland Bonaparte. No. 2, Kalmouks; No. 10, Atchinois.

From Dr. J. E. LEE.—The Bone Caves of Ojcow (Poland). By Prof. Dr. Fred. Römer. Translated by the donor.

From the AUTHOR.—Record of Family Faculties. By F. Galton, F.R.S.

—— Anthropologische Ergebnisse einer Reise in der Südsee und dem Malayischen Archipel in den Jahren 1879-1882. By Dr. O. Finsch.

—— Une mine de silex exploitée à l'âge de la pierre au Mur-de-Barrez (Aveyron). By M. Emil Cartailhac.

—— Comparison of Eskimo Pictographs with those of other American Aborigines. By W. J. Hoffman, M.D.

—— The Carson Footprints. By W. J. Hoffman, M.D.

—— Clavis Rerum.

From the SECRETARY OF STATE AND EDUCATION, GUATEMALA.—Anales Estadísticos de la Republica de Guatemala, 1882. Tom. I.
From the GERMAN ANTHROPOLOGICAL SOCIETY.—Archiv für Anthropologie, 1883. 1st and 2nd quarters.
—— Correspondenz Blatt. 1883, Nos. 11, 12; 1884, No. 1.
From the IMPERIAL ACADEMY OF SCIENCES OF VIENNA.—Sitzungsberichte: philos.-histor. Classe. Band 101, Heft. 2; Band 102, Hefte. 1, 2; Band 103, Hefte. 1, 2. Register X.
—— Sitzungsberichte math.-naturw. Classe. I. Abthlg., 1882, 6–10; 1883, 1–5. II. Abthlg., 1882, 7–10; 1883, 1–5. III. Abthlg., 1882, 8–10; 1883, 1–3.
—— Almanach, 1883.
From the ROYAL HISTORICAL AND ANTIQUARIAN ACADEMY, STOCKHOLM.—Teckningar ur Svenska Statens Historiska Museum. Tredje Häftet.
From the MANITOBA HISTORICAL AND SCIENTIFIC SOCIETY.—Annual Report for the year 1882, and Publications 1–4.
From the HUNGARIAN ACADEMY.—Pokucie. Tom. II.
—— Zbiór Wiadomości do Antropologii Krájowéj. Tom. VII.
—— Rosprawy i Sprawozdania z Posiedzeń wydzialu Matematyczno-Przyrodniczego Akademii Umiejetnosci. Tom. X.
—— Pamiętnik [Akademii Umiejetnosci w Krakowie Wydzial Matymatyczno-Przyrodniczy]. Tom. VIII.
—— the ACADEMY.—Boletin de la Academia Nacional de Ciencias en Córdoba. Tom. V. Entrega. 4.
—— Atti della R. Accademia dei Lincei. Transunti. Vol. VII, Fas. 16; Vol. VIII, Fas. 1, 2.
—— Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg. Tom. XXIX, No. 1.
From the ASSOCIATION.—Journal of the Royal Historical and Archæological Association of Ireland. No. 55.
From the COUNCIL.—Report of the Council of the Art Union of London, 1883.
From the INSTITUTION.—Journal of the Royal United Service Institution. No. 122.
From the SOCIETY.—Transactions of the Anthropological Society of Moscow. Tom. XXXVI, No. 2; Tom. XLIII, No. 1.
—— Fünfter Jahresbericht des Vereins für Erdkunde zu Metz. pro 1882.
—— Bulletin de la Société Impériale des Naturalistes de Moscou. 1883, No. 2.
—— Bulletins de la Société d'Anthropologie de Paris. 1883, Fas. 4.
—— Proceedings of the Royal Society. Nos. 227, 228.
—— Notulen van de Algemeene en Bestuurs-vergaderingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen. 1883, Nos. 1, 2.
—— Tijdschrift voor indische Taal-, Land-en Volkenkunde. Deel. XXVIII, Afl. 5, 6; XXIX, Afl. 1.
—— Journal of the Royal Asiatic Society. January, 1884.
—— Bulletin de la Société de Borda, Dax. 1883, 4th quarter.

From the SOCIETY.—Proceedings of the Royal Geographical Society. January and February, 1884.
—— Journal of the Society of Arts. Nos. 1624–1629.
From the EDITOR.—Revue d'Ethnographie. Tom. II, No. 6.
—— Revue d'Anthropologie, 1884. No. 1.
—— "Nature." Nos. 740–745.
—— "Science." Nos. 46–51.
—— Panjab Notes and Queries. Vol. I, Nos. 3, 4.
—— Revue Scientifique. Tom. XXXIII, Nos. 1–6.
—— Revue Politique. Tom. XXXIII, Nos. 1–6.
—— The Science Monthly. January, 1884.
—— The American Antiquarian. Vol. VI, No. 1.

The election of JOSEPH FOTHERGILL, Esq., was announced.

Mr. J. PARK HARRISON, M.A., exhibited some skulls and other remains from a cemetery at Wheatley, upon which Dr. GARSON made some remarks.

Mr. WORTHINGTON G. SMITH, F.L.S., exhibited two skulls of the Bronze age from a tumulus at Whitby.

Mr. HENRY PRIGG sent for exhibition two palæolithic implements and a fragment of a human skull from Bury St. Edmunds.

Mr. R. MORTON MIDDLETON exhibited some human bones from Morton, near Stockton, upon which Mr. PARK HARRISON made some observations.

Mr. J. T. YOUNG read a paper "On some Palæolithic Fishing Implements from the Stoke Newington and Clapton Gravels." A discussion ensued in which Mr. W. G. SMITH, Mr. GREENHILL, Mr. BAILEY, Dr. JOHN EVANS, and Mr. A. L. LEWIS took part, and the AUTHOR replied.

Dr. EVANS, having vacated the Chair, was succeeded by Mr. LEWIS.

A paper by Dr. G. B. BARRON, "On a Human Skull found near Southport," was read. This skull was described before the Institute by Professor George Busk in 1873 (see "Journal of the Anthropological Institute," Vol. IV, 1874, p. 104).

The following paper was read by Miss Buckland:—

On TRACES *of* COMMERCE *in* PREHISTORIC TIMES.

By ANNE WALBANK BUCKLAND.

THE subject of commerce, as carried on in prehistoric times, is of interest alike to the anthropologist, the archæologist, and the student of folklore and legends; for, if the extent of that commerce and its routes could be well defined, much that is obscure in the unwritten history of mankind would become

clear; since it is evident that variations in physical type, in language, in religion, in manners and customs, in legends and in the arts, would arise from a long-continued intercourse between barbarous and civilised, or semi-civilised races.

In the absence of written history, this intercourse can be traced only through legends, or by the vestiges discovered in tombs, in the refuse heaps known as kitchen-middens, or in the remains of long-buried cities destroyed by the hand of Time, by some sudden natural calamity, or by the inroads of enemies; and it is a singular and significant fact that, in the majority of cases, the relics brought to light by the spade of the archæological explorer, confirm in a wonderful manner legends which have been handed down from time immemorial.

As an illustration of this, I have thought it might perhaps be of interest to call attention, in the first place, to three cups of gold discovered—one some years ago in Cornwall, another at Mycenæ by Dr. Schliemann, and the third in the Necropolis of old Tarquinii. The first, of which a full description is given in the "Archæological Journal" for September, 1867, has been considered of sufficient importance to be figured in two of Dr. Evans's valuable works, that on "Ancient Stone Implements," and that on "Bronze Implements." The prominence thus given to this particular find impressed it strongly upon my mind, and I was therefore especially interested in seeing a gold cup which, as far as memory serves, is almost identical with the Cornish example, in the Museum at Corneto, being one of the numerous and very important relics found in the Necropolis of the ancient Etruscan city of Tarquinii. I was particularly struck with the crumpled-up handle, which seemed to suggest an identity with that of the British cup, as having been made of very thin gold, bent or waved, so as to resemble a ribbon. The third cup, that discovered by Dr. Schliemann among the treasures of Mycenæ, although bearing a strong general resemblance to the other two, differs from them in shape, but all three are undoubtedly of the same type: they are all of a corrugated pattern, apparently produced by the same means, that is, by beating out a thin plate of gold over a carved model of wood, stone, or perhaps bronze, the handle being rivetted on afterwards. A few other articles of a similar style, and almost of the same pattern, are known, one being an armlet of gold, found in Lincolnshire, and another the splendid gold corselet from Mold in Flintshire, now in the British Museum, but the pattern of the latter is much more elaborate, the plain ribs being alternated with bands of raised balls, the effect of which is very fine; nevertheless, Mr. Franks, no mean authority, classes this corselet with the Cornish cup and the Lincolnshire armlet, and also with

some other golden ornaments called lunulæ, some of which are found corrugated, although the majority are plain thin plates of gold, in the form of a crescent, hence their name; their use is somewhat uncertain, although they are commonly regarded as ornaments for the head, or gorgets. And amongst them I must not fail to notice one of great size and beauty, discovered in Ireland, which Keating says was "a chain, or collar, or breast-plate, worn on the neck of the judge when on the bench, and that it would close and choke him if he gave wrong judgment." This splendid specimen, figured in Vol. V of the "Archæologia," is not only corrugated, but ornamented round the edge somewhat after the fashion of the Mold corselet.

The great majority of these moon-shaped articles have been found in Ireland, fifteen of them being in the museum of the Royal Irish Academy, whilst four have been found in Cornwall, two in Scotland, and some nearly resembling them are reported in French Bretagne and in Denmark. Of these, there was also one, and I think parts of others, in the case containing the cup, in the Museum of Tarquinia-Corneto, having been found in the Necropolis of Tarquinii, but whether *with* the cup I cannot say. There is yet another class of golden articles frequently made in a corrugated form, and abounding in Ireland, where they are supposed to have been worn as buttons or clasps to fasten the outer garment, although it is probable that they also served as money, and these also, but of a small size, reappear at Tarquinia-Corneto. From their shape they were possibly either the origin of, or derived from the *fibulæ*, which are so numerous in Etruscan and Roman tombs. These fibulæ were chiefly of bronze, and most of the articles to which I have referred above are assigned to the bronze age.

It is certain that the corrugated pattern of the cups and of the Mold corselet is similar to that of numerous bronze shields, chiefly Etruscan, whilst I must not omit to mention that the pattern of the Mold corselet is reproduced in a small but very elegant cap or diadem of gold, in the museum of the Royal Irish Academy. There are numerous other points of resemblance between articles found in ancient Etruria and Ireland, but at present I will content myself with mentioning one more only, namely, the bronze horns or trumpets, which visitors to the British Museum may compare, and will not fail to be struck with the strong similarity.

Mr. Blight has observed that "it is very remarkable that all the Cornish gold ornaments have their counterparts in Ireland," but I venture to think that it is still more remarkable that Irish and Cornish prehistoric ornaments, whether in gold or bronze, should have their counterparts in Etruria and Greece:

yet so it is, and I think it will be allowed that it is a matter of extreme interest and importance to trace out when and by what means the intercourse thus indicated took place.

It is the custom at the present day to assign certain forms of ornament and certain implements, whether of stone or of bronze, to stages of culture, to suppose that man, in his earliest stage, will naturally resort to a certain form of stone implement, and that consequently these things may have been invented independently in most, if not in all the various countries wherein they are found. That this may have been the case sometimes, and with the simplest tools and ornaments, I should be sorry to deny; but I believe, and have always held, that the more complex forms of weapons, and of ornaments—the advance in culture from the savage to the agriculturist, from the stone-user to the worker in metal—were the results of an intercourse carried on by means little known or understood, but which is indicated alike by language, by manners and customs, by variations of race-type, by traditions, and lastly, by relics widely distributed, yet evidently the work of the same people. No one will, I suppose, imagine that the three golden cups and the other articles I have mentioned could have been independently designed in Greece, in Etruria, in Cornwall, and in Ireland; therefore it becomes of great interest to ascertain how these things—and doubtless with them many others of a more perishable nature—were transferred from country to country. The greater abundance of some of the articles mentioned, in Ireland, would seem to indicate that they were manufactured in that country, and thence transferred to the other distant lands wherein they have been found; but it seems more probable that the pattern, having been derived from the shores of the Mediterranean, was afterwards reproduced by Irish goldsmiths from native metal. It is possible that an analysis might prove the source whence the gold composing these ornaments was derived, that of Ireland being exceptionally pure. That the workmen and the patterns came originally from the shores of the Mediterranean there can be little doubt. Dr. Schliemann, in describing the cup I have taken as an example, speaks of it as being of the well-known *furrowed* pattern of the Greeks, for which they had a definite name.

Mr. Gladstone thinks the ornaments found at Mycenæ may have had a foreign origin, and it is certain that some of them have their counterparts in Assyria; but ancient Greece collected her stores from many sources, and if some can be traced to Assyria, others were as clearly derived from Egypt. Assyrian, Greek, and Egyptian influences are plainly perceptible in Etruria, but in all these countries it is evidently the *idea* which has been

interchanged, to be worked out differently in each country, according to the genius of the people. It is similarity, rather than identity; but as regards the gold and bronze relics of Etruria and Ireland, there appears in many cases to be absolute identity: therefore it seems evident, either that the articles themselves were conveyed from the one country to the other by commerce, or that the people of the two countries were the same.

The first is, of course, the proposition which will be most generally accepted; nevertheless there may be a certain amount of consideration accorded to the latter. Irish legends invariably bring the heroes of their history, and the founders of their nation, from Greece or some Mediterranean land, and a certain amount of truth is allowed to attach to these legends, although it is generally supposed that by "Greece" some nearer land is indicated, probably Spain. But if we read these legends by the light of archæology, it does not seem improbable that the Mediterranean may at least have contributed its quota to the various legendary migrations.

The late Sir William Wilde pointed out that traces of the three legendary races, the Firbolgs, whom he identifies with the Belgæ, the Tuatha de Dannans, and the Milesians, are still to be found in Ireland.[1] The colony of Partholan, said to have been destroyed by pestilence, and the Tuatha de Dannans, celebrated as necromancers, would seem to denote the more civilised Eastern nations, Phœnician or Etruscan.

The great battle of Moytura, fought between the Firbolgs and the Tuatha de Dannans, gave the latter the ascendancy; but in this battle both sides are said to have used *metal* weapons, and to have had Druid priests and enchantresses. The Firbolgs, being defeated, are said to have retired to Arran, in Galway Bay, and "there erected the most stupendous stone forts of cyclopean unmortared masonry that now remain in Europe, with walls 18 feet thick, resembling those of Mycenæ."[2]

In reading these stories, and in seeing the very substantial proofs that the stories are not wholly mythical, we are tempted to believe that colonies, differing in race, must have been planted in Ireland at various times, and that the Pelasgi, or whoever were the constructors of the cyclopean buildings, who preceded the Etruscans in Italy, must also have found their way to Ireland. The Firbolgs of the battle of Moytura, it must be observed, are no longer the rude Belgæ, described by Sir Wm. Wilde as found entombed with flint weapons and shell

[1] *Tuatha* means Commander; *du*, Gods; *Dannan*, Art or Poetry, being the three tribes of this people (Warner).

[2] Sir W. Wilde, "Ireland, Past and Present."

ornaments, but with no remains of metal, covered with huge stones and a mound of earth; they have attained to the knowledge of metal weapons, have chiefs or kings, a settled government, and a religion described as Druidical, and apparently similar to that of their opponents, the Tuatha de Dannans.

This change we can only suppose to have been caused by foreign influence, and for this foreign influence we must look to countries already acquainted with the use of metal, and practising that mode of architecture, and those religious rites which they would seem to have introduced among the Firbolgs, whose name Warner translates as "*creeping or cave men*," although Keating gives a legend that they were the descendants of the first Greek colonists, who had returned to Greece, been made slaves of there, and afterwards seized Greek ships and returned to Ireland, and he derives the term Firbolg from Fir, signifying *men*, and Bolg, a *bag*, from the leathern bags they had been compelled to wear, to carry clay dug from pits to the top of hills, to make a soil upon the rocks for cultivation.[1] I do not know what traces of the terraced cultivation, so much in use in Southern Europe, are to be found in Ireland, but the leathern bag may have another signification, for in the very interesting account given by Gmelin, Lepechin, and Pallas, of the mines worked on the south-east borders of the Ural mountains, presumably by the Arimaspi, prior to the conquest of the country by the Tatars, and before any knowledge of iron, we are told: "Besides some implements, the use of which is unknown, there were wedges and hammers all of copper that had been smelted, but without any particle of gold in them. Instead of sledges they seemed to have used large stones of a long shape, on which are to be seen marks which show that handles had been fastened to them. They seem to have scraped out the gold with the fangs of boars, and collected it in leather bags or pockets, some of which have been found."[2] Now, as there seems to be no doubt that it was the search for metal—whether gold, tin, or copper—which tempted foreigners to our shores in the remote times of which we are speaking, and as it is well known that gold was found in Ireland in considerable quantities, we seem to see in these Firbolgs, with their leather bags, a colony of miners from Asia or from Greece, establishing themselves where they found the precious metal, making themselves kings or chiefs over the barbarous natives, instructing them in the arts, especially of metallurgy, and giving to them their own name (Firbolgs). That gold was an article of

[1] Keating's "History of Ireland."

[2] Jacob's "Historical Enquiry into the Production and Consumption of the Precious Metals."

commerce in very early times in Ireland is proved by numerous discoveries of ingots, as well as of manufactured articles, in bogs, and in excavations for railways, &c. Vol. III of the "Archæologia" gives a long list of discoveries of gold in Irish bogs, amongst the articles being several ingots, some of which are described as of the form of "heaters for smoothing" three of them weighing seven pounds and a half; whilst the innumerable manufactured articles prove that it was not only miners and merchants who thus established themselves, but also artificers of no mean skill.

The question arises whether these artificers were the Firbolgs, or that later race, designated as Tuatha de Dannans, whom I have ventured to regard as Etruscans?

Returning to the three cups and other articles of gold with which I commenced this paper, I may point out that Mr. Evans compares the Cornish cup with one of amber found near Brighton, and with another of Kimmeridge shale found at Broad Down near Honiton, the latter being very similar in shape; but if we go thus far for analogies, we may perhaps be allowed still further scope, and refer to sculptured monuments in Tartary, upon which a figure appears holding a cup of a very similar shape, and also, if the engravings are to be trusted, of the same corrugated pattern, as though it were an object of veneration, or of some especial significance. It may possibly have been a golden cup similar to these, of which we are told that Darius the Great, having one only, valued it so highly that he placed it every night under his pillow.

We thus seem to be able to trace cups of this particular pattern from Tartary to Greece, Etruria, and Great Britain, and may ask whether they were manufactured originally in Tartary, possibly by the Arimaspi, of whom so many fables have been related, carried by their owners from place to place, perhaps for purposes of divination, and at last buried with them as their most precious possession.

If the Firbolgs were Scythians, and acquainted with metallurgic arts, it is of course possible that articles of this especial furrowed pattern might have been manufactured by them in Ireland, and thence dispersed; but if the Firbolgs are in any way to be identified with the rude miners of the Ural mountains, a description of whose implements I have given, they would not seem to have been capable of the delicate work exhibited in the cups, the lunulæ, the Irish diadem, the Mold corselet, the Lincolnshire armlet, and other articles; and we must therefore suppose them to belong to a later period, and to have been introduced by a second Scythic wave, or by another people. Seeing the strong resemblance between these

articles and those to be found in the museum of Corneto-Tarquinia, and remembering how famous the Etruscans were for their bronzes and gold work, I prefer to think that these articles were introduced by the Etruscans, either directly or indirectly; that they had obtained the pattern—at least of the cups—through Greece, the latter country having received it perhaps from Persia, and originally from Scythia.

With the Cornish cup were deposited articles of ivory, glass beads, pottery of a reddish-brown colour, and a bronze spear-head, with other fragments of metal, all consistent with that Etruscan ownership or origin which I have ventured to assign to it. "The Etruscans, masters of the sea," says Dr. Birch, "imported enamelled ware from Egypt, glass from Phœnicia, shells from the Red Sea, and tin from the coasts of Spain or Britain." Whether this trade was carried on wholly by sea, or whether a trade route existed at this remote period across Europe, cannot be very easily decided, but it seems to me that it would not be impossible to trace these early merchants by their wares, through the Swiss lake villages and Gaul to our own shores, and across Cornwall and Wales to Ireland, in which island there would seem to have been a more permanent settlement made. Nevertheless, it is easy to see that a coasting voyage round Spain, destined for Britain, might be driven more than once by storm or contrary winds to Ireland, which, once discovered, and found to possess metals of various kinds, would certainly be revisited, and probably made a depôt for commerce, or a settlement for mining purposes.

Indications that one at least of the races thus visiting Ireland was Etruscan may, if I mistake not, be found, not only in the articles of bronze and gold I have described, but also in traditions and in the pages of history.

Cæsar's assertion that the gods of the Gauls and Britons were the same as those of Rome; that the Druids made use of Greek characters, although apparently ignorant of the Greek language;[1] the great influence possessed by women, especially in Ireland, where I believe the genealogies were traced in the female line as in Etruria—the extraordinary powers of divination ascribed to the Druids and to the Tuatha de Dannans, seem to stamp them as of Etruscan race, or at least as having derived their traditions, as well as their gold and bronze implements, and perhaps their mode of sepulture, from Etruria. The great tumuli of New Grange, Dowth, &c., were, unfortunately, rifled by the Danes, but the markings upon the stones might fairly be looked upon as Etruscan, and there is every

[1] Cæsar, Book VI, p. 17; V, p. 48; I, p. 25.

reason to suppose that the arrangement of the tombs, and the treasures they contained, were such as might still be found in those great tumuli, which evidently preceded the underground painted tombs in the Necropolis of old Tarquinii, if only some competent archæologist would devote to them the attention which has been given to our own great tumuli; and if that diligent and scientific research could be extended to the desolate site of the city of Tarquinii, I feel assured that many discoveries of infinite value to archæology and anthropology would reward the explorers. I have dwelt in this paper chiefly on the evidences of prehistoric commerce between Mediterranean peoples and our own islands, as afforded by gold and bronze articles, but the subject might be indefinitely enlarged, and I trust some one more competent than myself will take the matter up, and assign to each race its proper share in spreading civilisation by means of commerce from East to West. I have spoken more particularly of the Etruscans, because there seems a tendency to ignore all prehistoric commerce except as carried on through the Phœnicians, whereas it appears to me that Etruscan influences are far more evident than Phœnician, for I do not think that any of the articles I have mentioned as discovered alike in Ireland and in the Necropolis of old Tarquinii have been found among undoubted Phœnician remains, although there are doubtless others which may be referred to that source, and some which may also be traced to Greece and to Egypt. I feel convinced that a careful study of prehistoric commerce, as revealed by relics such as those I have indicated, when undertaken by competent workers, will eventually throw a flood of light upon the anthropology and archæology of Great Britain and Ireland.

In conclusion, I may say that I am quite aware that in pointing out the connection existing in the Bronze Age between Etruria and Ireland I am not bringing forward a new theory; in fact, General Vallancy many years ago gave as *one* indication of this intercourse, the fact that the survival of one form of divination, existing in a game played with five small stones, is called in Ireland *clocha tag*, or *tag* stones, from Tages, the prince of Etruscan diviners; but that to which I wish particularly to call attention is, that this connection appears to me to be made much clearer by recent discoveries in the course of the explorations in the Necropolis of old Tarquinii, which I think in the interests of science should be carefully watched, noted, and *extended;* for the discoveries made there since 1878 seem to me to supply one of the missing links in the chain of evidence connecting East and West in prehistoric times.

It may be of interest in connection with this subject to note

that a friend of mine has recently dug up, on the Goodrington Sands, Paignton, two vases of *tin*, pronounced by the authorities to be Roman, but which will perhaps turn out to be of earlier date.

Discussion.

Mr. Walhouse said that he had little to offer on the subject, and that little related only to its Oriental aspects. Evidence of the extreme antiquity of communication between Europe, Western Asia, and the far East was continually accumulating. Even the folklore, nursery-tales and fairy stories of Europe were being more and more shown to be of Iranian or Buddhist origin. It had been long acknowledged that the apes and peacocks brought by Solomon's fleets must have come from the Indian Peninsula, and so no doubt did the perfumed gums and incense so largely used in the temples of Egypt, Asia Minor, Greece, and Southern Italy; the classic "Olibanum" was a product of Indian jungles, probably identical with the perfumes used to-day in Hindu temples and ceremonies. The beautiful variety of beryl, known as aquamarine, "of the colour of pure sea-water, and found only in India," as Pliny remarks, was well known in antiquity, and several engraved gems of it, of the best classic period, exist in European cabinets; now aquamarine stones of that particular colour have only been found at one particular spot in Southern India, about 140 miles from Calicut, on the Malabar coast, a port much frequented in the ancient traffic between the Red Sea and India, and it is noteworthy that deposits of Roman coins have several times been found in the neighbourhood of the aqua marine mine, which may not unreasonably be regarded as vestiges of ancient communication and traffic.

Captain E. C. Johnson, having been called upon by the Chairman to make some observations, said that the remarkable identity of the cups, ornaments, &c., found in the Irish mounds with those of Greece and Asia Minor must strike the most casual observer; and on drawings of those in the Royal Irish Academy being taken by Mr. Oscar Wilde to Greece, and compared with Dr. Schliemann's, they were found to be scarcely distinguishable from each other. This of course may be accounted for either on the hypothesis of a simultaneous development of certain art forms in various parts of the world, or on the supposition that both were made by the same people. This latter appeared to the speaker the more probable, strengthened as it was by the fact that the spiral and ammonite-shaped markings were found in the mounds of Ireland and also at Mycenæ and Hissarlick, also that there was certainly a considerable flow of commerce between the shores of the Black Sea and Mediterranean and Ireland in those early times. These art forms are our only guides through the tangled labyrinth of prehistoric legends. The early Nemedian invaders of Erin were a tribe from Greece who, at first unsuccessful, returned in a later wave as the Tuatha du Dannans. They appear to have had artificers skilled in metals amongst them,

as they were recorded as having made a silver hand for their king, Nuada, when he lost his own in battle with a kindred tribe, the Firbolgs. These artificers were probably, as Miss Buckland thought, Etruscans, or were largely indebted to the metal workers of Etruria for their knowledge of the art. The character of their work suggested a Turanian origin, into which Phœnician mythological ideas had entered, as shown by the demi-lune or horned ornament. The Turanian type was also very marked in faces of the peasantry in and over parts of Ireland. He had visited the tumulus of New Grange, and observed that while the mouth itself had an Etruscan form, the stones at the entrance were put up in the Druidical manner, differing from the arch gates common to Etruscan tombs. There was also a circle of stones outside, which may have had some connection with the sorceries and wizardees with which the Tuatha du Dannans were credited by their contemporaries.

Mr. PARK HARRISON, Mr. G. W. ATKINSON, Signor PAGLIARDINI, and Mr. A. L. LEWIS took part in the discussion; and Miss BUCKLAND replied.

FEBRUARY 26TH, 1884.

EDWARD B. TYLOR, Esq., LL.D., F.R.S., *Vice-President, in the Chair.*

The Minutes of the last meeting were read and signed.

The following presents were announced, and thanks voted to the respective donors:—

FOR THE LIBRARY.

From R. N. CUST, Esq.—A Language Map of Africa. By E. J. Ravenstein. To accompany "Modern Languages of Africa." By R. N. Cust.

From the AUTHOR.—The Dominion of Canada. By Joseph G. Colmer.

—— GEOLOGICAL AND NATURAL HISTORY SOCIETY OF CANADA.—Report of Progress for 1880–82, and Maps.

—— BERLIN ANTHROPOLOGICAL SOCIETY.—Zeitschrift für Ethnologie, 1883. Heft. VI.

—— GERMAN ANTHROPOLOGICAL SOCIETY.—Correspondenz-Blatt. February, 1884.

From the ACADEMY.—Atti della R. Accademia dei Lincei. Transunti, Vol. VIII, Fas. 3, 4.

From the ASSOCIATION.—Journal of the East India Association. Vol. XVI, No. 1.

—— Proceedings of the Geologists' Association. Vol. VIII, No. 4, and Annual Report, 1883.

From the SOCIETY.—Bulletin de la Société d'Anthropologie de Bruxelles. Tom. I, 1882–3.
—— Journal of the Society of Arts. No. 1630.
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—— "Nature." Nos. 746, 747.
—— Revue Politique. Tom. XXXIII, No. 8.
—— Revue Scientifique. Tom. XXXIII, No. 8.
—— "Science." Nos. 52–54.

The election of the following new members was announced:—Miss H. M. HARGREAVES and Miss HELEN E. PEARSON; Dr. WALTER H. C. COFFIN; and Dr. EMIL RIEBECK.

The following paper was read by Dr. E. B. Tylor:—

The NANGA, *or* SACRED STONE ENCLOSURE, *of* WAINIMALA, FIJI.

By the REV. LORIMER FISON, M.A.

[WITH PLATES I AND II.]

THE Nanga custom which I am about to describe is one of special interest, firstly, because in Fiji it is peculiar to certain tribes, their immediate neighbours, and, as far as I have been able to ascertain, all the other Fijian tribes, being unacquainted with it; and, secondly, because it is distinctly connected with the ceremony of initiation, or "making young men," of Australia, and probably with the so-called "clubs," or "secret societies," prevalent throughout Melanesia.

If, with a chart of Fiji before us, we start from Nandi, on the west coast of Navitilevu (Plate II), and proceed east to the 178th meridian, which takes us about to the centre of the island, and thence along a south-south-west course to Korolevu,[1] on the south coast, we shall pass through the tribes who observe the Nanga; and everywhere, to the right of us and to the left as we go, there are tribes who are not initiated into its mysteries. Along the line of its prevalence there are differences of detail in the rites performed, and in the structure of the Stone Enclosure,[2] but the main object of the principal ceremony is

[1] Korolevu is marked "Red Bluff" on some of the charts.

[2] At Nandi the Nanga is within the war-fence of the town. This seems to be made necessary by the close proximity of hostile tribes. When thus placed, it is much smaller than the Wainimala Nanga here described. When it is within the town, the women make a circuit to avoid it in passing, and the children are forbidden to play in its neighbourhood.

everywhere the same, namely, the reception of young men into full membership in the tribe. Every full-born male is by birth a member of the community, but he is not a *man* until he has been received into the Nanga, and even then he does not attain full membership until he has attended two of its celebrations, one of which is that at which he was initiated. It will be seen that the effect of this regulation is to keep him on probation for at least two years.[1]

The Constitution of the Nanga.

The Wainimala community, in addition to the ordinary social divisions into clans, &c., which have hereditary succession through males, is divided as to its adult males into three sections, corresponding to those of the Nanga, or Stone Enclosure. These will be seen in the accompanying sketch (Plate I), which may now be explained.

This sketch was kindly made for me by Mr. Leslie J. Walker, of the Civil Service, who worked from a ground plan drawn by one of our mission teachers, named Jimi Nakoravau, and from my description, which was based solely on information carefully drawn from the natives, I having never had an opportunity of visiting the Wainimala country in person. The drawing, therefore, can only be taken as an approximate representation, but there is no doubt that it is sufficiently correct for the purpose of showing the arrangement of the structure.[2] The bell-roofed house outside the farther end is the *Vale tambu* (Sacred House, or Temple). The division next to it, in which the *kava* bowl stands, is the *Nanga tambu-tambu* (Sacred Nanga). That in the middle is called the *Nanga levu* (Great Nanga), and the third section is the *Nanga sewa*, or Little Nanga. The entire structure is fenced round with stones set edgeways in the ground, the *katumbas*, or entrances, shown in the plan being merely low places easily stepped over. The two partition walls are about 5 feet high, by 3 feet at the base, narrowing to 2 feet at the top, which is neatly covered with flat stones.

The elders of the community are the *Lewe ni Nanga tambu-tambu*, or Members of the Sacred Nanga. These are called the Vērĕ, the very old men among them being the *Vērĕ matūa* (ripe, or old Vērĕ).

[1] The present tense is used throughout this memoir, but the Nanga ceremonies are no longer performed.

[2] An old Wainimala man, to whom I showed Mr. Walker's drawing, tells me that there are too many great stones in the outer wall, but that otherwise the structure is fairly represented. This, however, is not quite conclusive, for we can never be sure as to what a native sees when he looks at a picture.

Next to them, the men who have attended at least two initiation ceremonies are the *Lewe ni Nanga levu.* Their designation is the Vūnilōlō, the seniors among them being the *Vŭnilōlō matūa.*

Lastly, there are the young men on probation, the Vīlavóu, who are *Lewe ni Nanga sewa,* though it will be seen that in the ceremonies they enter both the other divisions of the Nanga. Below these, and not within the Nanga, are the women, the uninitiated youths, and the children.

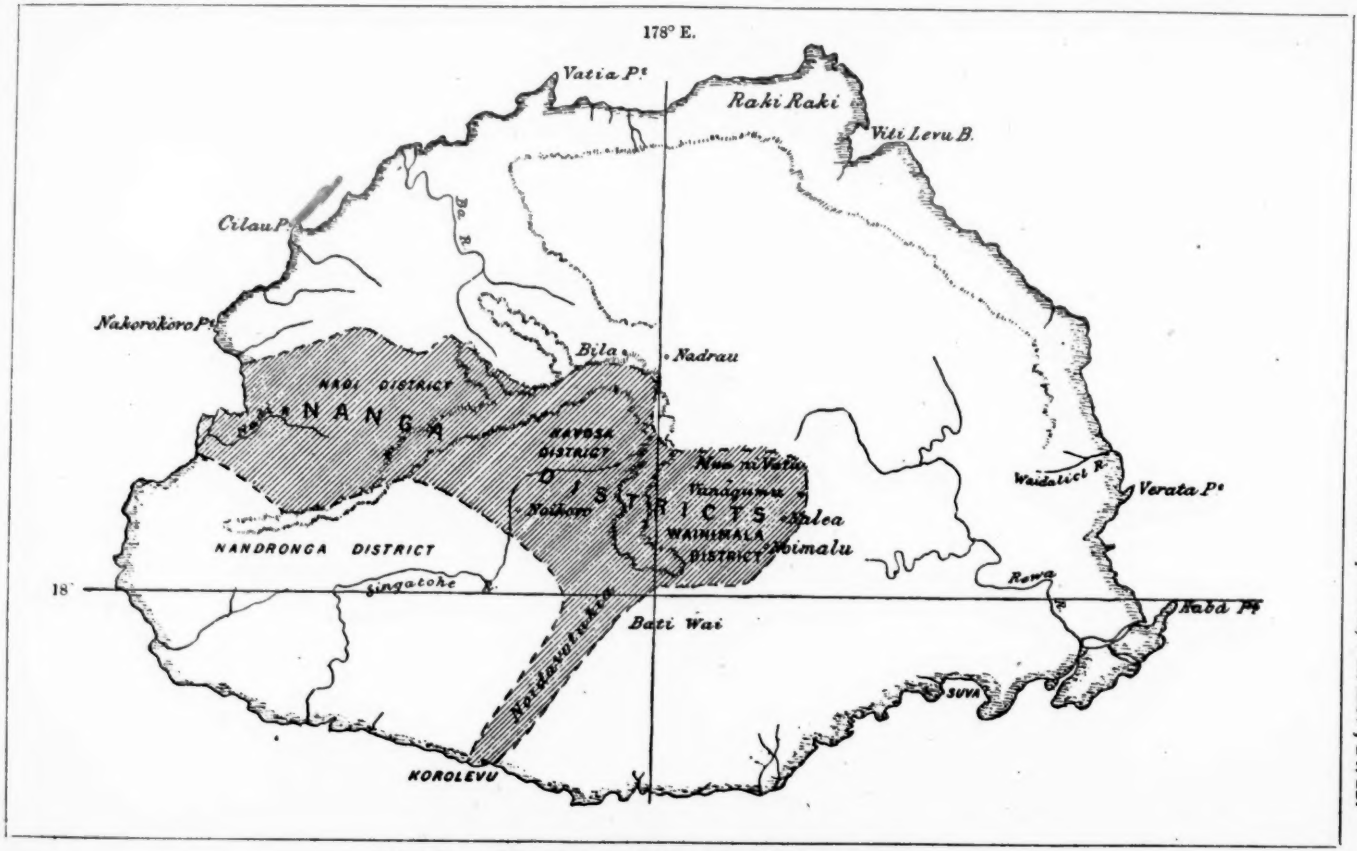
No alien can be a Lewe ni Nanga. Thus, one of the Wainimala tribes, called the Kai Muáirā, has neither part nor lot in the matter, though it is called upon to help in the feast-making, and in the offerings of native cloth, &c., during the ceremony, and it has the privilege of sharing in the saturnalia which follow. This falls in with Australian custom, as shown by my friend Mr. Howitt, in his account of the Kroatun Kŭrnai,[1] and in his intensely interesting narrative of the late Kuringal, or ceremony of initiation, which he himself summoned in his capacity as *Baiamban* (Master) by sending the mysterious *turndun* (bullroarer) to the various tribes.

This exclusion from the Nanga is evidently based on lack of qualification; and the most probable explanation seems to be that in all such cases the people so excluded are alien tribes which have attached themselves to the community, but have not become fully incorporated with it. It is certain that this is so in the case of the Kai Muáirā. The Wainimala people are really Navosā tribes (see Plate II[2]) who migrated to their present seats many generations ago, subjugating, but not driving out, the Muáirā folk, who were there before them. Some of the invaders subsequently made their way down to the south coast at Korolevu, and established themselves along the line of migration. These are the *Nóindávotukía,* or Dwellers at Ndavotukia, a name which represents their ancient seats, not their present abode. These clans have a Nanga of their own, and do not go up to the initiation ceremony at Wainimala. The Muáirā people, therefore, are alien clans, attached to the community, but not in full connection with it.

The invaders are of three principal tribes: the Nōimālu, the Kai Vunanggūmu, and the Kai Nalēa. All of these have connubium with the Kai Muáirā; but, descent being through males, this fact does not affect the status of the latter people. The son of a Muáirā woman by a man of the invading tribes is qualified for admission to the Nanga. He inherits the qualifi-

[1] "Kamilaroi and Kŭrnai," p. 308.

[2] The map of Navitilevu, showing the Nanga country (Plate II), was drawn for me by Mr. J. P. Thompson, C.E., of the Survey Staff.



MAP OF NA VITI LEVU, SHOWING THE NANGA DISTRICTS.

cation from his father. But the son of a Muáirā man, whosoever his mother may be, is not so qualified. His father had no qualification to transmit to him. It is, however, interesting to note that, if a man of this birth leave his father's village, and attach himself to his mother's clan, as is sometimes the case, and marry into one of the affiliated clans, his son will be admitted into the Nanga, though the fault in his birth will always be remembered against him, and may be thrown in his teeth at any time if he take too much upon himself.

The Building of the Nanga.

"This is the word of our fathers concerning the Nanga," said an old Wainimala greybeard to me. "Long, long ago their fathers were ignorant of it; but one day two strangers were found sitting in the *rārā* (public square), and they said they had come up from the sea to give them the Nanga. They were little men, and very dark-skinned, and one of them had his face and bust painted red, while the other was painted black. Whether these two were gods or men our fathers did not tell us, but it was they who taught our people the Nanga. This was in the old old times when our fathers were living in another land—not in this place, for we are strangers here. Our fathers fled hither from Navosā in a great war which arose among them, and when they came there was no Nanga in the land. So they built one of their own after the fashion of that which they left behind them. And this was the building of it." All the able-bodied men were summoned to assemble at Narókorókoyáwa, the chief *koro* (village), and a council was held as to the building of the Nanga. Certain of the old Vērĕ matūa, belonging to a clan called the Kai Rukuruku, who are the priests, were deputed to choose the site. These men accordingly went forth, and, having selected an unfrequented spot about a mile from the town, on the other side of a stream which runs thereby, their headman—whom we may call the chief priest—poured out upon a rock, or at the foot of a tree, a libation of *kava* to the ancestral gods; "and, calling upon those who died long long ago by name, he prayed that the people of the tribe, both old and young, might live before them." Having performed this rite, the old men went back to the town, and sent all the able-bodied males to clear the chosen plot, and to collect great piles of stones ready for the building.

The outline of the Nanga was then marked out, and trees planted around it, principally *Lauthi* (Candlenut), *Vasīḷi ndámundámu* (Red-leaved Dracæna), together with odoriferous shrubs such as *Thevūnga*, &c. This work was closed with

another libation and prayer, and a day was set on which a thankoffering feast should be made. On the set day the food prepared was carried to the Nanga site by the women; and its spiritual essence having been offered to the dead, its grosser particles were devoured by the living. The feast was in four divisions, made respectively by the Vērĕ, the Vūnilōlō, the Vīlavóu, and the uninitiated youths and children.[1] That prepared by the Vērĕ was eaten by the Vūnilōlō, and *vice versâ*, while the Vīlavóu and the uninitiated exchanged their portions. The feast was closed with the usual libation and prayer; and the time having been appointed for the erection of the stone walls, the people dispersed to their villages.

At the time appointed they all assembled once more, bringing pigs, yams, &c., for their support during the progress of the work. Temporary huts were erected in the neighbourhood of the Nanga, in which the workmen slept, it being strictly forbidden for any one to return to the town until all was finished. All other work was suspended. Not even food-planting might be done while the Nanga was building: and, if any impious person transgressed this law, "he would only plant evil to himself and to his kinsfolk." The Vērĕ were fed sumptuously every day while the work was going on by the Vīlavóu, who provided baked pigs and other delicacies, especially eels, of which the feeble-toothed elders are very fond, together with the usual vegetable accompaniments.[2] These feasts were cooked at the Nanga, and consumed by the Vērĕ alone. Not even the Vūnilōlō matūa could get as much as a taste of them. They must provide for themselves. When the Vīlavóu take the uncooked food to the Nanga they are ornamented in their best style, and sing as they go the following chaunt, whose words are repeated over and over again :—

Ai sevusevu
Ki na Nanga levu—

("an offering to the Great Nanga"). A young man of the priest clan leads them on, having in his hand a green stalk of *kava* with the leaves attached. He conducts them to the place marked out for the *Nanga tambutambu*, and, taking his stand by the Sacred Bowl, which is set there filled with water (see Pl. I), he dips the *kava* branch into it, and sprinkles the youths one by one as they advance with their burdens. This

[1] I observed that the old Wainimala man made no distinction between the uninitiated men and the children. He classed them all together in his narrative as "*ko ira na ngone*" = they, the children.

[2] These feasts are repeated at every preparation of the Nanga for the initiation ceremony.

ceremony having been performed, they may now proceed to bake the pigs and other food in the hot stone ovens. Were any one of them to attempt the cooking without undergoing the previous baptism, he would become *sacer*, and some terrible calamity would surely befall him.

The building of the Nanga being accomplished, the workmen return to the town, having been preceded thither by the Vērĕ. When they enter the *rārā* they find the chief priest standing there, holding in his arms a large wooden dish piled high with cooked yams cut into small pieces. Every man goes up to him, and takes a piece of yam, which is eaten standing, and in solemn silence. No one may sit down while this rite is being performed. It is the *vúluvúlu* (literally "handwashing"), or release from the tapu which has been laid on all manner of work, save only that immediately connected with the building of the Nanga.

The yams being eaten, the people then seat themselves in the *rārā*, and the priest, or one of the old Vērĕ, informs them that there will now be an interval of two years, during which they must be diligent in planting food, and in making all manner of valuable articles, especially weapons of superior finish. Let the *samusamu* also of the women—the rhythmical tap-a-tap of their grooved hardwood mallets used in beating out native cloth—be heard continually. Let it never cease. And let all men exercise self-denial in the matter of pork, that there may be many great pigs to offer up at the ceremony of initiation, which will take place at the end of the two years. The people respond with clapping of hands, and a deep-toned, long-drawn shout, and thereupon the assembly is dismissed.

The Ceremony of Initiation.

As there was an interval of two years between the building of the Nanga and the first initiation, so also there is a similar interval between the successive ceremonies. This period, however, is not necessarily restricted to two years. There are always a number of youths who are growing to the proper age, and the length of the interval depends upon the decision of the elders. Whenever they judge that there is a sufficient number of youths ready for admission, a Nanga[1] is appointed to be held; and thus the interval may be longer or shorter, according to the supply of novices. Other circumstances, too, may interfere with the holding of a Nanga. For instance, it may be deferred indefinitely by a protracted war; a famine may render it

[1] Strictly speaking, the Nanga is the Stone Enclosure, but the word seems to be used for the ceremony of initiation also.

impossible to supply the necessary quantity of food; or epidemic disease may so thin the ranks of the candidates that years may elapse before a sufficient number can be mustered for presentation. In particular instances also a youth may be prevented from taking part in the ceremony by illness, or his initiation may be deferred as a punishment for misconduct. Hence it comes about that, while as a general rule the young men are eligible for admission at about the age of puberty, or a little after, a number of them may pass their majority before they are made members of the Nanga, and thus it is generally the case that bearded men, who have children of their own, are found side by side with mere youths among the Vīlavóu.

As the time appointed for holding the Nanga draws nigh, all the members of the community—not excepting even the Kai Muáirā, who, as before stated, are not members of the Nanga—bestir themselves briskly in making the necessary preparations. Enormous quantities of yams are garnered, and, placed under a strict tapu, the numerous pigs which were set apart for the ceremony are plentifully fed, bales of native cloth are stored on the tie-beams of the house-roofs, spears of many devices are furnished, with cruel barbs ingeniously fastened along their points, and elaborate patterns of curious carving are diligently worked on clubs of various kinds. The day being near at hand, the final preparations are made. A broad pathway is cleared from the town to the Nanga, crossing the intervening stream at a fording-place. The *Vale tambu,* or Temple, is repaired; the interior of the Stone Enclosure is cleared of all accumulations, and made perfectly clean; temporary huts are built for the accommodation of the members of the Nanga; and a substantial weatherproof storehouse is erected within the enclosure for storing the property which will be presented.

On the day appointed, the Vērĕ and the Vūnilōlō go first to the Nanga, and make their offerings, the chief priest having opened the proceedings by libation and prayer.

The heads of the novices are shaved clean,[1] and their beards too if they have any; and this operation having been performed with a shark's tooth, or a small hard shell assisted by a fire-stick,[2] long rolls of native cloth are wound round their bodies.

[1] These men thus prepared present a curious appearance to the European eye, owing to the remarkable shape of their heads, which are narrowed by lateral pressure during infancy. Elsewhere in Fiji the fashion is to flatten the back of the head, which forces the skull upwards at the back, and extends it laterally. The shape of the head being thus altered artificially, craniological arguments as to these people are to be received with caution, for tribes of the same race have different fashions, and press their children's heads into different shapes.

[2] Razors are now commonly used, but I have often seen a mother shaving her child's head with a bit of glass, and biting a new edge on the instrument when it grew dull. Only a few days ago I saw a Solomon Islander shaving his

Each youth takes a spear in one hand and a club in the other, and thus accoutred they follow an old Vērĕ, one of the priest clan, whose business it is to conduct them to the Nanga. He leads the way, holding in his hand his carved staff of office, and they follow in single file, carefully treading in his footsteps. He conducts them to the Great Nanga, where the Vērĕ matūa and the Vūnilōlō are now seated, chaunting a song in a deep murmuring tone, which occasionally swells to a considerable volume of sound, and is supposed to represent the noise of the surf breaking on a far-away coral reef. The young men throw down their weapons before them, and, with the help of the Vūnilōlō, divest themselves of the huge folds of native cloth in which they are enveloped, each man revolving slowly on his own axis, while his attendant pulls at his bandage, and gathers in the slack. The weapons and the cloth are the novices' offering, and are put way in the storehouse by the Vūnilōlō, under the direction of the Vērĕ. The novices are then taken back to the houses built for their accommodation, and the ceremonial part of the proceedings is over for the day. It is now well on towards evening, the early part of the day having been fully occupied in the preparation of food, and afterwards in the "getting up" of the young men for their presentation in the Nanga. The ovens are now opened, the baked pigs and other savoury contents taken out, and a general feasting ensues until far into the night. This is repeated for four days, a like presentation being made on each occasion; and as each man is merely the central roller, as it were, of a huge bale of cloth, the amount offered is something considerable. Having thus made themselves acceptable to the ancestral spirits, who are supposed to be present at the Nanga, the novices are now ready for the final presentation on the fifth day.[1]

On the morning of that day a huge feast is prepared; and, when their culinary labours are over, the young men, with their heads fresh shaven, are swathed in the largest and best rolls of cloth, and take in their hands the choicest weapons which have been reserved for this occasion. Following their leader, the old Vērĕ with the graven staff, their eyes fixed upon the ground that they may tread exactly in his footsteps, they proceed to the Great Nanga as on the former occasions. But where are the men who used to be chaunting there the Voice of the Surf? The Great Nanga is deserted and empty. The procession stops. A dead

comrade's chin with a fragment of glass in the public street of Suva. He used neither soap nor water, and yet he effected a clean shave, which would have done credit to a barber.

[1] If the supply of food be limited, the ceremony is shortened, two presentations being made on each day, the final one taking place on the third day.

silence prevails. Suddenly, from the forest a harsh scream of many parrots breaks forth, and then a mysterious booming sound which fills the young men's souls with awe. The old Vērĕ now moves slowly forward, and leads them for the first time into the Nanga tambutambu. Here a dreadful spectacle meets their startled gaze. Near the outer entrance, with his back to the Temple, sits the chief priest regarding them with a fixed stare; and between him and them lie a row of dead men, covered with blood, their bodies apparently cut open, and their entrails protruding. The Vērĕ steps over them one by one, and the awestruck youths follow him until they stand in a row before the high priest, their "souls drying up" under his strong glare. Suddenly he blurts out a great yell, whereupon the dead men start to their feet, and run down to the river to cleanse themselves from the blood and filth with which they are besmeared. These are the Vērĕ with some of the Vūnilōlō matūa, who represent the departed ancestors on the occasion, the blood and entrails being those of many pigs which have "fallen for that night's repast." The scream of the parrots and the mysterious roaring sound were made by hidden performers, the latter being produced by blowing strongly into a bamboo trumpet, the mouth of which is partially immersed in water.[1]

The dead men having come to life again, the novices offer their weapons and the bales of native cloth in which they are swathed. These are removed to the storehouse, and the young men are made to sit down in front of it. The chief priest now relaxes the sternness of his demeanour, and becomes a remarkably lively old gentleman. Dancing to and fro from one side of the Nanga to the other, he cries in stridulous tones, "*Uē, ā-uē, āo ɣvēi!* Where are the people of my *longa* (enclosure)? Are they gone to Tongalevu? Are they gone to *Tumbalevu* (the deep sea)?" Presently a deep-toned chant is heard, and the revivified dead, cleansed and ornamented, come from the river with a rhythmical movement timed to their solemn chant.[2] They take their places in front of the young men, and silence ensues. Four of the Vērĕ matūa come in, one bearing a cooked yam carefully wrapped in leaves so that no part of it is touched by his hands; the second brings a piece of baked pork, similarly enveloped; the third, a

[1] This bamboo trumpet seems to be the equivalent of the Australian bull-roarer. It is never sounded by the Wainimala folk, excepting at the Nanga. It would be impious to sound it for mere sport.

An inferior kind of bullroarer is used in Fiji—a piece of split bamboo swung round on a string. But it is a mere child's toy, and is not used in the mysteries.

[2] The sound of the chants is solemn enough, but the words of some of them appear to have little meaning. Others are filthily obscene.

drinking cup of cocoanut shell or earthenware filled with water, and wrapped round with native cloth; while the fourth carries a napkin of the same material. The yam-bearer puts the end of his yam to the mouth of each novice in succession, and they nibble small bits from it; the pork is tasted in like manner; the water follows, the youths merely wetting their lips; and last comes the napkin-bearer, who wipes their mouths. They are now addressed by the chief priest, or one of the very old men, who warns them solemnly against disclosing to the uninitiated any of the mysteries they have seen and heard, and assures them that the vengeance of the gods will most certainly overtake them if they are disobedient.

This ceremony being over, all the Lewe ni Nanga come forward, and each man presents to the novices a yam and a piece of nearly raw pork, which has been merely warmed through in the ovens, and requires further baking. The young men take this food, and go away to cook it for eating. In the evening twilight an enormous pig, which was specially set aside[1] at a former Nanga for this occasion, is dragged through the *Vale tambu* into the enclosure, and there presented to the novices, together with others if necessary, sufficient to make them a plenteous repast.

They are now Vīlavóu, accepted members of the Nanga, qualified to take their place among the men of the community, though still only on probation. As children—their childhood being indicated by their shaven heads—they were presented to the ancestors, and their acceptance was notified by what (looking at the matter from the natives' standpoint) we might, without irreverence, almost call the *sacrament* of food and water, too sacred even for the elders' hands to touch. This acceptance was acknowledged and confirmed on the part of all the Lewe ni Nanga by their gift of food, and it was finally ratified by the presentation of the Sacred Pig. In like manner, on the birth of an infant, its father acknowledges it as legitimate, and otherwise acceptable, by a gift of food; and his kinsfolk formally signify approval and confirmation of his decision on the part of the clan by similar presentations.[2]

On the following morning, the women, who have been summoned by a messenger from the Vērĕ, come up to the Nanga. Their hair is dyed of a reddish colour, and they are dressed in a number of *likus*—waistbelts of hibiscus, or other fibre, doubled over a string, thus forming a sort of fringe about

[1] There are many pigs of the Nanga thus set apart, but this particular pig is *the* Nanga pig *par excellence*.

[2] Illegitimate children are not thus recognised. The mothers are cared for in secret, and no formal presentations are made.

9 inches or a foot deep. These are tied on one over the other from the waist nearly up to the breasts, and give the women the appearance of being enveloped, as to that part of the body, in a neat thatch. We now begin to tread on delicate ground, but one may be permitted to say that, taking into consideration the postures they have to assume, it seems a pity that some of the thatching is not put on from the waist downwards instead of expending it all in the other direction. When the women come up none of the Lewe ni Nanga are in sight, excepting the Vērĕ matūa, who are seated in the Nanga tambutambu chanting a song called the *Vaya*, but all the other men are in hiding near by. Entering in single file at the Little Nanga, the women prostrate themselves, and crawl thence on their hands and knees through the Great Nanga into the Nanga tambutambu, where the elders are singing the solemn chant. The chief priest dips his hands in the Sacred Bowl, which is filled with water, and offers a prayer to the ancestral spirits for the mothers and for their children. This is called the *vúluvúlu* (hand-washing)[1] of the women, the priest's action being vicarious on their behalf. The prayer being over, the women return along the way by which they came, crawling over certain earth-mounds in the Nanga, which have been specially prepared for the occasion; and it must suffice to say that, when one of the mounds is topped and the descent on the other side begun, the desirability of a better arrangement of the *likus* suggests itself. The women, as they retire, chant a song called the *Ruérué*. When they emerge from the Nanga, the men who have been hitherto concealed rush upon them with a sudden yell, and an indescribable scene ensues. The accounts of my informants vary as to what takes place, probably because the proceedings are not uniform in all the Nangas, and also because with the imperfect materials at our command it is not easy to distinguish between other rites which are celebrated at the Nanga, and those of the initiation ceremony. But all my informants agree in stating that the men and the women address one another in the filthiest language, using expressions which would be violently resented on ordinary occasions, and that from the time of the women's coming to the Nanga to the close of the ceremonies very great licence prevails.[2]

[1] The *vúluvúlu* is in all cases a release from a *tapu*. Its meaning in this instance seems to be a temporary suspension of the *tapu*, which prevents women from entering the Nanga. None but males are qualified to enter it.

[2] Mr. Walter Carew, Commissioner for Tholo West, was assured by the old men of Wainimala that—at least on some occasions—the men rushed upon the women while they were in the Nanga, and that any woman laid hold of within the enclosure was for the time the lawful prize of her captor. But I have not

Various dances of great indecency having been performed, the women return to the town, and the men prepare to follow. The Vērĕ lead the way, taking nothing with them, but the rest of the Lewe ni Nanga ornament themselves with long trains of native cloth, and daub one another's faces and busts with black paint. The Vūnilōlō and the Vīlavóu being thus adorned, and holding a green bough in each hand, follow to the town. As they cross the ford they dip the branches into the stream to make them glisten in the sunlight, and shake them to and fro as they advance, their feet keeping time to a rhythmical chant. The Vērĕ are seated near two large candlenut saplings, which were concealed in the long grass during the previous night, and they welcome the new-comers with a deep-toned shout, "*Uēō, uēō, nduāsā-ā-āmu!*" to which the others shout responsive, and clap their hands crosswise in unison, producing a hollow sound.

The two saplings are then set up, and between them is piled the property which has been already presented. This is now supplemented by large gifts made by the Kai Muáirā and others, who are not Lewe ni Nanga, but are connected with the community. Various parties of these men are concealed near the town, and bands of the Lewe ni Nanga go out to seek them, chanting a song which I am unable to interpret. Having found the hidden parties, they turn, and lead them to the spot where the poles are set up, and there they deposit their offerings. These proceedings may last for several days, during which an enormous quantity of property is accumulated, great feasts are devoured, and an almost unlimited licence between the sexes prevails. The Vērĕ matūa then share out the store of wealth which has been presented, taking excellent care of their own interests in the division, and they set apart a number of pigs to serve for the next ceremony. These beasts are henceforth sacred. They are the pigs of Nanga, and have the run of all the overflowings of the fleshpots in the villages where they are appointed to be kept. They are held in the greatest reverence. To kill one, excepting for sacrifice at one of the Nanga rites, would be an inconceivable act of sacrilege, and it is an act of piety to feed them. Men may be seen throwing down basketfuls of food before them as a meritorious offering, and calling the attention of the ancestors to the gift—"Take knowledge of me, ye who lie buried, our heads! I am feeding this pig of yours."

The last act of the ceremony is the *Sisīli*, or Bath.[1] All the

been able to ascertain whether this licence is connected with the initiation ceremony, or with one of the other occasions on which the Nanga is used.

[1] I am not certain as to the time when the *Sisīli* takes place—whether it is soon after the return from the Nanga, or not until all the property has been

men who have taken part in the Nanga rites go together to the river, and there carefully cleanse themselves from every particle of the black paint with which they have been bedaubed. The new-made Vīlavou are then brought to the chief priest, and seated before him and the Vērĕ matūa on the river bank. He delivers to them an impressive discourse on the new position they have assumed, points out to them the duties which now devolve upon them, enjoins strict observance of the tribal customs, threatens them with the sure vengeance of the gods if they reveal the Nanga mysteries to the uninitiated, and especially warns them against eating the best kinds of yams and other vegetables. These, together with freshwater fish and eels caught in the river, are forbidden to them. They must present them to the elders, and content themselves with wild yams, and such articles of food as are not so highly esteemed. As the black paint with which they were adorned mingled with the water of the stream, and flowed away from them when they washed themselves, so also, if they disobey these injunctions, will the comely dark colour of their skins disappear, and leave them of a hideous pallor, a spectacle abhorrent to both gods and men.

Other Rites of the Nanga.

1. *Sacrifice and Thank-offering.*—The foregoing are the main ceremonies connected with initiation, as far as I have been able to ascertain them; but, in addition to them, there are other rites performed at the Nanga. In fact it is the Sacred Place where the ancestral spirits are to be found by their worshippers, and thither offerings are taken on all occasions when their aid is to be invoked. Every member of the Nanga has the privilege of approaching the ancestors at any time. When sickness visits himself or his kinsfolk, when he wishes to invoke the aid of the spirits to avert calamity or to secure prosperity, or when he deems it advisable to present a thank-offering, he may enter the Nanga with proper reverence, and deposit on the dividing wall his whale's tooth, or bundle of cloth, or dish of toothsome eels so highly prized by the elders, and therefore by the ancestors whose living representatives they are: or he may drag into the Sacred Nanga his fattened pig, or pile up there his offering of the choicest yams. And, having thus recommended himself to the dead, he may invoke their powerful aid, or express his thankfulness for the benefits they have conferred, and beg for a continuance of their goodwill.

As might have been expected, for some time after the

given and shared out. But it is certainly the closing act of the ceremonial part of the proceedings.

Wainimala people abandoned heathenism, offerings were taken on the sly to the Nanga, and the Mission teachers used to keep a sharp look-out for footprints leading in that direction. One of them who visited it about two years after the nominal acceptance of Christianity[1] by the tribe, described it to me as filled with a thick growth of grass and weeds; but there were whales' teeth still lying on the wall of the Sacred Nanga, the bones of many pigs strewed the enclosure, and in the gateway an enormous hog with a fine pair of tusks was lying in an advanced stage of decomposition, showing that some of the people were still making sacrifices to the ancestral gods.

2. The *First-fruits of the Yam Harvest* are presented to the ancestors in the Nanga with great ceremony before the bulk of the crop is dug for the people's use, and no man may taste of the new yams until the presentation has been made. The yams thus offered are piled in the Great Nanga, and are allowed to rot there. If any one were impiously bold enough to appropriate them to his own use he would be smitten with madness. The mission teacher before-mentioned told me that, when he visited the Nanga, he saw among the weeds with which it was overgrown, numerous yam vines which had sprung up out of the piles of decayed offerings. Great feasts are made at the presentations of the first-fruits, which are times of public rejoicing, and the Nanga itself is frequently spoken of as the *Mbaki*, or Harvest.

Circumcision.—With the exception of the initiation ceremony, the most interesting of the Nanga rites are those connected with *Circumcision*. When a man of note is dangerously ill, a family council is held, and it is agreed that a circumcision shall take place as a propitiatory measure. Notice having been given to the priests, an uncircumcised lad—the sick man's son or one of his brother's sons—is taken by his kinsman to the *Vale tambu*, or God's House, and there presented as a *soro*, or offering of atonement, that his father[2] may recover. His escort make valuable presentations of property at the same time, and promises of more. These are graciously received by the priest, who sets a day on which the operation is to be

[1] I use the phrase "nominal acceptance of Christianity," certainly not in any sense depreciatory of mission work, but simply because it represents the actual fact. The turning of such a tribe from heathenism as a political movement (which was the case with the Wainimala folk) is nothing more than this in the first instance. It is only a certain class of platform orators at home who speak of such a movement as the "conversion" of an entire people, using the word in its theological sense. Missionaries in the field do not talk like that.

[2] "His father." If it were one of the sick man's brothers' sons who was taken, the term "father" would be none the less applicable according to the Fijian system of relationship.

performed. In the interval no food may be taken from the plantations excepting what is absolutely required for every day use, no pigs or fowls may be killed, and no cocoanuts plucked from the trees. Everything, in short, is put under a strict tapu, and all must be set apart for the great feasting which is to take place when the ceremony is performed.

On the day appointed, the son of the sick chief is circumcised, and with him a number of other lads whose friends have agreed to take advantage of the occasion. Their foreskins, stuck in the cleft of a split reed, are taken to the Nanga, and presented to the chief priest, who, holding the reeds in his hand, offers them to the ancestral gods,[1] and prays for the sick man's recovery. Then follows a great feast, which ushers in a period of indescribable revelry. All distinctions of property are for the time being suspended. Men and women array themselves in all manner of fantastic garbs, address one another in the most indecent phrases, and practice unmentionable abominations openly in the public square of the town. The nearest relationships—even that of own brother and sister—seem to be no bar to the general licence, the extent of which may be indicated by the expressive phrase of an old Nandi chief, who said, "While it lasts, we are just like the pigs." This feasting and frolic may be kept up for several days, after which the ordinary restrictions recur once more. The rights of property are again respected, the abandoned revellers settle down into steady-going married couples, and brothers and sisters may not so much as speak to one another. Nowhere in Fiji, as far as I am aware, excepting in the Nanga country, are these extravagances connected with the rite of circumcision.[2]

[1] Compare Zipporah's offering on behalf of Moses, Exodus iv, 25.

[2] Mr. Edward O'Brien Heffernan, Native Advocate, and Stipendiary Magistrate, kindly made, at my request, a special inquiry into the extraordinary licence attending the rite of circumcision at Nandi, and sent me a written statement concerning it, taken down by him from the lips of one Nemani Dreu, in the presence of the principal chiefs of Nandi, Vunda, and Sambeto. Subsequent inquiry more than confirmed the statement, which is unfit for publication. Of necessity in this memoir I omit certain particulars of almost incredible indecency, which I have privately forwarded to Dr. Edward B. Tylor. [The details of indecent dances and rites referred to may be left in MS., but it is of interest, as bearing on the argument as to early communal intercourse, of which such customs may possibly be ceremonial survivals, to notice that their principle is formulated in an accepted native phrase. On the fourth day, when the food is no longer *tabu*, but *tara* (permitted), and the great feast is prepared, it is said that there are no *taukei ni vuaka se alewa* ("owners of pigs or women)." Not only does it appear that the groups of tribal brothers and sisters (using this term according to the native system of kinship) are not excluded from this temporary communism, but another MS. account by Mr. Fison mentions their being intentionally coupled, falling in one behind another in the Nanga procession, with the accompanying chant in the most explicit terms,—

"*Ne cégenía e tu e mata.*"

Concluding Remarks.

No Fijian custom has given me so much trouble to ascertain it as that of the Nanga; and, since the facts are new, and of considerable importance, it may be well to state the authority on which they rest. Vague rumours of strange practices among the hill tribes of Navitilevu reached me long ago from time to time, but it seemed to be impossible to get at any definite information concerning them.

For several years I tried in vain to ascertain them through our native mission agents who were stationed in the hill country. They told me the people either pretended ignorance, or refused to speak because they were bound to silence by "oaths to the dead;" and yet tantalising disconnected bits of information leaked out now and then. The old men especially were very reticent. They were evidently afraid to speak, and when by persistent questioning I got some fragment of description from them as to the less important parts of the subject, they were very uneasy, and anxious to escape from me. About a year ago, Nakorovau, the artist who drew the ground plan of the Nanga, and who is an old pupil of mine, sent me an account of the initiation ceremony which he had managed to extract from a young Vīlavóu, who had been made a Lewe ni Nanga at the last celebration before the tribe abandoned the practice. But the account was incomplete, there were many points in it which called for further inquiry, and it did not explain all the facts—*e.g.*, those connected with circumcision —which I had already in my possession. After much fruitless inquiry, I happily fell in with an elderly Wainimala man, who had been one of the Vūnilōlō matūa, and whose confidence I won by giving him a detailed account of the Australian Bora. He listened with all his ears, and with eyes opening ever more widely. Presently, while we were talking, a woman passed by, and lowering my voice, I said, "Hush! the women must not hear these things." This finished him. Covering his mouth with his open hand he said earnestly, in an awestruck tone, "Of a truth, sir, you are a Lewe ni Nanga. I will tell you all about it." And he poured out his soul. As he warmed in the narrative, his eyes sparkled, his lips quivered with excitement, his body swayed to and fro, and his arms waved in quick gesticulation such as is never seen among the coast tribes. Unfortunately, I had only one interview with him; and though I learned much from him, there are still many things to be sought out.

This rite seems at least open to interpretation as a remarkable case of "consanguine marriage" being kept up as a ceremonial institution.—[E. B. T.]

Sufficient, however, has been ascertained to convince me that the Wainimala Nanga is identical with the Australian Bora, and that, as I stated in my introductory remarks, it probably connects with the so-called club or secret society, which is found throughout Melanesia as far at least as New Britain, where it is called the *Dukduk*. But there is one important distinction between the Australian usage and that of Wainimala which must be noted. In some, at least, of the Australian tribes a young man is not permitted to take to himself a wife before initiation, nor indeed until he has served his subsequent probation of two years: whereas, among the Wainimala people, he may take possession of the girl who was betrothed to him in infancy, without any further ceremony, as soon as he considers her to be old enough. He announces his intention to his comrades, and they watch for an opportunity of seizing the girl in the forest, when the husband takes possession of her, but, (as far as I have been able to learn) without the "expiation for marriage"—to use Sir John Lubbock's convenient and appropriate term—which is accorded by so many Australian tribes.

The customs of the clubs or secret societies of the New Hebrides, Banks, and Solomon groups, when ascertained, will doubtless throw more light upon the Nanga mysteries. For what we may call the Nanga tribes in Fiji are evidently, both in custom and in language, more Melanesian, so to speak, than the rest of the Fijians. According to their traditions they came into the hills from the West. Establishing themselves first at Nandi, they made their way throughout the country shown in the map until they formed a connection with the southern coast at Korolevu. And the fact that they found the Kai Muáirā in the Wainimala country before them shows that they were immigrants of a later date.

The temporary licence between the sexes, and the suspension of proprietary rights in general, during some of the Nanga ceremonies, is well worthy of note. What does it mean? And why, both in Fiji and in Australia, is it resorted to as a means of expiation? We cannot for a moment believe that it is a mere licentious outbreak, without an underlying meaning and purpose. It is a part of a religious rite, and is supposed to be acceptable to the ancestors. But why should it be acceptable to them unless it were in accordance with their own practice in the far away past? There may be another solution of this difficult problem, but I confess myself unable to find any other which will cover all the corroborating facts.

Description of Plates I and II.

Plate I.

View of the Nanga, or Sacred Stone Enclosure, of Wainimala, Fiji. From a sketch by Mr. Leslie J. Walker, Civil Service, Fiji.

Plate II.

Sketch-Map of Na Viti Levu, showing the boundaries of the Nanga Districts. Drawn by Mr. J. P. Thomson, C.E., M.I.S., Government Surveyor, Fiji. The Nanga districts are shaded.

The following paper was read by the author:—

On the Languages *of* Melanesia.

By the Rev. R. H. Codrington, M.A.

By *Melanesia* is here meant the chain of groups of islands of the West Pacific which stretch in a kind of curve from New Caledonia to New Guinea, west of Polynesia. The boundary eastwards is very well defined, Fiji being as plainly Melanesian as Tonga is Polynesian. New Guinea is not included in the present consideration, partly from want of knowledge of its languages, chiefly to keep away from the use of the term Papuan. I desire not to name the languages of Melanesia, with which I am acquainted, after a people or a country of whose languages I know very little.

The groups of the Melanesian Islands are—

1. New Caledonia, with the Loyalty Islands.
2. The New Hebrides.
3. The Banks' and Torres Islands.
4. Fiji.
5. Santa Cruz, and the Reef Islands.
6. The Solomon Islands.

My own acquaintance with the languages of these islands is limited, but it extends to each of these groups, and covers a good deal of the ground from the Loyalty Islands to Ysabel in the Solomons. Beyond that I have the valuable addition of the language of Duke of York Island, between New Britain and New Ireland, by the kindness of Mr. Brown.

From within the limits of Melanesia, as thus defined, certain places with their language have to be withdrawn from consideration. They are those in which the language is Polynesian, in fact Tongan; part of Three Hills, Futuna and Aniwa, Fila,

in the New Hebrides; Tikopia, some of the Reef Islands of Santa Cruz; Rennell Island and Bellona Island, south of the Solomon group, and Ongtong Java to the north. The presence of these distinct Polynesian outliers in Melanesia presents no difficulty, and is interesting. For the purpose of the present paper it is important to observe that the Melanesian languages in immediate proximity to these Polynesian settlements, show no more Polynesian character than those that lie far away. The language of Mae, in Three Hills, is in fact Tongan; that of Sesake, two miles off, is known to me, and certainly in my view is no more Polynesian than the languages of the Banks' Islands; which again are very much more like Fijian, than that is like Tongan, its very much nearer neighbour on the Polynesian border.

The object of the present paper is to set forth the view that the various tongues of Melanesia are homogeneous, belong to one common stock; and, secondly, that this stock is the same to which the other ocean languages belong: Malayan, Polynesian, the languages of the islands that connect Melanesia with the Indian Archipelago, and Malagasy.

The view which is opposed is one according to which the original Melanesian stock of language is distinct from that to which Malay and Polynesian belong; the theory according to which whatever in Melanesian languages is found common with Malayan and Polynesian is said to be introduced from, or due to influence from, either Polynesian or Malay, as the case may be.

I am very far from denying that words have been introduced, and language influenced, from the Polynesian or the Malayan side, though I do not think the modern Malay of commerce has reached Melanesia. What I believe is, that whatever has been introduced, from the one side or the other, into the Melanesian tongues, has been introduced not from a foreign but a kindred stock. I shall endeavour to give briefly my reasons for this belief.

The first view of the Melanesian languages, as a whole, shows a surprising assemblage of tongues differing so widely among themselves that within very short distances they become mutually unintelligible. In these are found, by those who are acquainted with Malay on the one hand, or Polynesian languages on the other, a number of words and forms which they recognise as familiar, and naturally take to have been introduced. It is not difficult to conceive how the Melanesian languages may have become so very different, if the present inhabitants are supposed to have arrived at their present seats at different times by various routes, and to have had little intercourse between them-

selves. But the differences in some cases are so very great that it is not easy at once to believe them all of one stock. Further acquaintance, however, diminishes the sense of difference; languages to the ear very unlike are seen on paper to be varying forms of the same. In this way, as the circle of acquaintance widens, languages are learnt more and more to be alike. Finally, in my own case, I may say that of the more than thirty Melanesian languages I have examined, there is not more than one (of which I know very little indeed) which still seems to me to stand much outside the groups into which the others have arranged themselves.

I may give as an example the language of Santa Cruz. Any Melanesian language seemed easy to Bishop Patteson, but he was never able, for lack of sufficient intercourse, to make acquaintance with that of Santa Cruz. Within the last few years it has become accessible; and though very strange at first, with a very different vocabulary, and with curious phonetic changes, it soon showed itself as familiar in its main structure, it arranged itself on the lines of the other Melanesian languages. The same has been the case with me in every Melanesian language I have become acquainted with. There are groups, as Fijian, Banks' Islands, the nearer and further Solomon Islands, which, differing among themselves, come on the whole near together. But some, till they are examined, seem strange and widely different, such as the Loyalty Island languages, Ambrym, Santa Cruz, Savo; and, when they are examined, show their family connection.

There is one characteristic of some of the Melanesian languages which again causes them to appear of a very distinct family. If any one, for example, should approach the Southern New Hebrides from New Zealand, he finds not only a vocabulary generally very different, but a very rugged consonantal form of words, strongly contrasting with the very vocalic Maori he has left. The difference, therefore, between Melanesian and Polynesian languages seems extreme. But when the whole Melanesian language field is surveyed, it is found that Fijian and the Solomon Island languages generally refuse to close a syllable, and that some of the Solomon Island languages are as vocalic as the Polynesian poorest in consonants. More than this, in a little district of the Banks' Islands there is one language, Motlav, which throws out every vowel it can; while its neighbour within three or four miles, Volow, substantially the same, is almost as vocalic as Fijian. It is impossible, therefore, to regard vocalic character as a mark of difference.

In the matter of vocabulary, the Melanesian languages are seen to have a great variety among themselves, and also to have

words plainly the same as those belonging to Malay or Polynesian. Are these words necessarily borrowed, or do they belong to the Melanesian speech?

By way of example I will take the words for "house" in Vanua Lava, an island fifteen miles long in the Banks group. There are four words belonging to different dialects, *govur*, *qeqek*, *im*, and *eng*, at first sight all very different. Of these *qeqek* is quite local, *govur* is rather more widely used; but *im* and *eng* are the same, and are forms of a very well known word, which in Malay is *rumah*.

This word in Melanesia, to begin at the furthest extremity, appears in the Loyalty Islands as *'ma;* in Anaiteum, *eom;* in Eromanga, *imo;* in Fate, *suma;* in Api, *uma;* in Northern New Hebrides, *ima;* in the Banks' Islands, *uma*, *ima*, *ema*, *im*, *em*, *eng;* in Santa Cruz, *ma;* in the Solomon Islands, *ruma*, *luma*, *nume*, *rima*, *nima;* in Duke of York Island, *ruma*.

Here are a considerable variety of Melanesian forms. There are corresponding forms to all these in the Malay Archipelago—*rumah*, Malay; *umah*, Javanese; *luma*, *lume*, *huma*, *um*, *om*, in various parts. What are we to suppose? That *ruma* in S. Cristoval has come from Malay, *uma* in Santa Maria from Java, *suma* in Fate from *huma* in Bouru, *lima* in Malanta from Tidore or Amboyna? Or, as it seems to me, that it was an original word belonging to a common stock, assuming various forms according to phonetic laws, and carried about here and there by the currents of population, which have streamed in distant or recent ages into the Melanesian and Indonesian Archipelagos alike?

In inquiring into the relationship of languages, one cannot refuse the aid of vocabularies. It is true that if one finds a word in two or more languages, that is no proof of relationship at all. It may be accidental, or one may have borrowed from the other. But one language *need* not have borrowed from the other. No one now says that, when the same word appears in Greek and Latin, the Latin has borrowed from the Greek. No one says we have borrowed the word "house" from the German.

So, also, a very great difference in the names of common things is no proof of difference of family of languages. A little vocabulary of most common words in two languages very closely akin may make them appear widely different. Take English and German for horse, dog, pig, woman, boy, girl.

Why, then, if the same word appears in Malay and Melanesia, must the Melanesian word be borrowed? Why, if names of some common things are different in this Melanesian and that Polynesian language, must the two languages needs be distinct? No one denies that the presence of common words in Greek and Latin, English and German, goes to prove a common origin. No

one doubts their common origin, because they differ so much in vocabulary.

Mr. Wallace, in his book on the Malay Archipelago, has collected vocabularies of 117 words in thirty-three languages of those islands. I have selected seventy of his words, and have obtained, more or less accurately, the equivalents in forty Melanesian languages. By this means one can compare Melanesian vocabularies, among themselves, and with those of that Archipelago. It is impossible to go into much detail here; but I must say that to my mind the comparison goes far to show the Melanesian languages homogeneous, and agreeing very much in vocabulary with the others. He has exceptional words, besides those which commonly agree, and so have I; and his exceptions occur often among my words, and my exceptions among his words.

I will give an example of the information which may be thus derived from the vocabularies. The word for "blood," in Malay, is *darah*. This has its representatives in varying forms through the Indian Archipelago, down to the extremity of Melanesia in the Loyalty Islands, where it appears as *dra*. The root is no doubt *ra*, which is reduplicated to *rara*, and *lala*. By assuming *d* to strengthen *r*, the word becomes *dra*, *dara*, *nara*, and so *dar*, *nar*, *tar*. By another change *ra* becomes *da* and *ta*. In Madagascar alone I find *ra;* the other forms are scattered irregularly from the Malay Peninsula to the Loyalty Islands. The same word thus, in varying forms but with the same meaning, is widely distributed alike in the Malayan and Melanesian regions.

But the Maori for "blood" is *toto;* which does not appear at all in Mr. Wallace's vocabularies, and only in one of mine. I happened, however, to find out that the disease *hæmaturia* is called *mimi toto* in one part of the Solomon Islands, and that congealed blood is called *toto* in another part of the same group. In the Banks' Islands, also, I have been long familiar with *toto* as the name of a poisoned arrow, smeared with the thick juice of a tree which is called *toto* because of the abundance of *totoai* (sap) in it. In Fiji, also, *dotoa* is a word for the sap, which is the blood, of trees. The root idea in the word is evidently one equally belonging to blood and sap. If any one should think that *dra* or *nara* has been introduced to the Banks' Islands from Malay, meaning blood, it is impossible to think that Polynesian influence should have made their word for blood received in those islands for the sap of trees.

Examples of this kind could be multiplied. When the word, in whatever form, varies its meaning in different places, still representing the original idea, the evidence of common kindred

is more complete. Thus *langi* is "sky" in Fiji, Malay, Malagasy, Maori; "wind" in the Banks Islands; "rain" in the Solomon Islands. So words disused and forgotten in their primary meaning survive in a secondary. *Tasi* is no longer "salt" or "sea" in the Banks Islands, but they *tasig* their food with salt; the lake in Santa Maria is the *Tas*, like Itasy in Madagascar; and the weather side where the sea breaks is *tasmaur* (the live sea) in Mota, and *Taimoro* in Madagascar.

Thus also no one can doubt the identity of the Maori *whetu*, Banks' Islands *vitu*, Solomon Islands *veitugu*, Celebes *bituy*, Malay *bintang*, meaning "star." But in Dayak *betuch anuh* is the sun, the same word evidently with a different application. And this is similar to the use of *maso andro* for "sun" in Malagasy, while *masoe* is a star in the Banks Islands.

The mouth is *baba* in Sumatra, *vava* in Madagascar, *waha* in New Zealand, *wawa* in North New Hebrides, *wa* in Duke of York Islands. In the Banks' Islands the word appears only as a verb, *wawanga*, to open the mouth.

If *pana* is Sanscrit, the word in various forms has certainly reached Melanesia, both as "bow," and "arrow," and "shoot." But in the Malay Archipelago there is another word, which *pana* may be supposed to have superseded, in Amblaw, Gilolo, Amboyna, Ceram, viz.: *busu, pusi, husu;* and this is of course the common Melanesian word *usu, vusu, vucu*, of the Banks Islands, New Hebrides, and Fiji.

But much as I think we may learn from vocabulary, we may certainly use grammar with more security. Languages do borrow grammatical forms, but not, surely, so easily as words. Here, however, are two considerations that I think it very desirable to advance.

Languages which have no inflections necessarily have little grammar, comparatively; and what they have in some points can hardly fail to correspond. If, then, we find two languages which suffix a personal pronoun to make a possessive, we cannot argue from that alone that they belong to a common stock. But if, bringing in vocabulary, we find that they suffix the same form of pronoun, we are much more secure in claiming relationship.

Secondly, it will not do to take as a standard a late, simplified, or decayed form of language. It will not do to say, because you find in Greek characteristic forms which are not found in Italian, that those are elements of a foreign stock: it will not do to judge a language which claims to be Gothic by its likeness to English. Malay is the English of the farther East, knocked about and simplified in the course of its use as a common medium; the Polynesian languages are the "Italian of the

Pacific." You cannot, I say, pronounce anything found in Melanesia to be of a radically distinct stock, because it is not found in Samoan or Malay.

By way of grammatical example, I will take the suffixed pronoun just referred to, and the verb.

In all Melanesian languages that I am acquainted with, except one, the personal pronouns which are suffixed to give a possessive in Malay, as *ku, mu ña*, are employed, more or less, in one form or another.

The root of the first person suffixed is *k*, which becomes *nng*, and *ng*, and *g*. That of the second is *m*, which, passing ough a modified and nasal *m*, becomes *ng*.

That of the third is *n*, which becomes *ñ* and *d*.

There shows in Melanesia, here and there, a disposition to vary in the use of the second person suffix: a variation which appears also in the kindred tongues.

The table here added will give a conspectus of the varying Melanesian forms, for comparison among themselves, and with three others.

	First.	Second.	Third.
Malay	ku	mu	ña
Malagasy	ko	nao	ny
Maori	ku	u	na
Duke of York Island..	ng	ma	na
Solomon Islands—			
Bugotu	nggu	mu	ña
Florida	nggu	mu	na
Ulawa	ku	mu	na
Malanta	ku	mu	ne
S. Cristoval..	gu	mu	na
Santa Cruz	ke, nge	mu	de
Nifilole	..	mu	..
Torres Islands	k	*ma*	na
Banks' Islands—			
Motlav	k	(m)	n
Volow	ngg	(m)	n
V. Lava	k	*m*	n
Santa Maria	k	ng	n
Merlav	k	ng	na
Mota	k	*ma*	na
New Hebrides—			
Aurora	k	nga	na
Pentecost	nggu	*ma*	na
Espiritu Santo	ku	mu	na
Lepers' Island	nggu	mu	na
Sesake	nggu	ma	na
Anaiteum	k	m	n
Ambrym	ng	m	n
Loyalty Islands—			
Nengone	go	..	ne

It is evident from vocabularies that these suffixes are found as commonly in the Indian Archipelago as in Melanesia. But in the Polynesian languages they are only found in what are called possessive pronouns, and indeed are not commonly recognised as suffixed pronouns. In Melanesia the suffix is only made to a certain class of nouns according to strict rule, besides its use with the nouns of possession. Nowhere in Melanesia is this rule more strictly observed than in Fiji, on the very confines of the Polynesian languages, which not only, like the Malay, have not this rule, but suffix only to the possessive noun. But Melanesians, as soon as they begin to speak with foreigners, depart from their strict rule, and come down to the practice of Polynesians: a modern Fijian will say *noqu liga*, "my hand," instead of *ligaqu*, as the N. Z. Maori will say, *noku ringa*, who knows no better. This is significant, that the Melanesian uses, in strict rule, a form which has gone out of common use in Malay, and only is found in one connection in Polynesia.

With regard to the verb, it is, so far as I know, the universal practice in Melanesia to employ a particle before a word which marks it in use as a verb. In some languages the use is more extended than in others, and the particles used vary very much; but I know of no language whatever in which the verbal particles are not used. In the Polynesian languages I believe, as in the Melanesian languages generally, as in Malagasy, these particles change to mark the tense. In Malay this is not so. This exception surely leaves a rule which binds the ocean languages together.

Again, the Melanesian verb has, wherever I know it, the characteristic of assuming a definite transitive termination; whether such as the *raka*, *taka*, *caka*, of Fiji, or the simpler consonant added, as when *tangi*, to weep, becomes *tangisi* almost anywhere in Melanesia.

This the Maori has not, though it is easy to recognise the same forms in their passive verbs, and verbal substantives. If, then, one is to be told that the Fijian has borrowed verbal particles from the Polynesian, whence has it borrowed its transitive terminations? If in the Solomon Islands they have borrowed transitive terminations from the Malayan side, whence have they got their verbal particles marking tense? It appears to me that the verb has its particles, and transitive terminations generally, in the oceanic family of languages at large; though this or that member of the family may lack this or that member of the verbal form.

Finally, if there be an original distinct stock of the languages of the natives of Melanesia, where are we to find it? Has it

wholly disappeared? This is surely extremely improbable; any such circumstances as might have brought it about seem to be inconceivable, in face of the fact that in Fiji, which is closest to Polynesia, the characteristics of Melanesian language are particularly strong.

I have already said of those Melanesian languages which seem exceptional, such as those of the Loyalty Islands, Ambrym, Santa Cruz, Savo, which look so different from many of the rest that they may well be thought to be representatives of an ancient and distinct stock, that when they are investigated they show the same grammatical structure as the rest. I at least find no distinct foreign forms presenting themselves.

If there were any such distinct elements, possibly we should expect to find them also in the Australian tongues. But whereas one who is acquainted with one or two Melanesian languages finds himself at home with the vocabularies and grammars of all the ocean languages, Melanesian, Polynesian, Indonesian, Malagasy, how very different is the case when from the hardest Melanesian language he transfers himself to an Australian! In no Australian vocabulary that I have seen have I recognised a Melanesian word; in nothing that I have seen of Australian grammar have I found my Melanesian experience at home.

The information I have received about the language of Erob, Murray Island in Torres Straits, shows grammatical forms quite strange to me as Melanesian, and apparently Australian. Of New Guinea languages my knowledge is very slight; that of Motu, at any rate, is Melanesian. I am quite ready to believe in Australian language-forms as well as kangaroos in New Guinea, and the islands close to Australia. But I am sure that from the Melanesian side one does not recognise Australian languages as akin.

The languages spoken in Polynesia and in the Indian Archipelago seem to me plainly akin to the Melanesian; whatever influences have worked, or are working, on Melanesia, from the one side or the other, I believe to be the influences of kindred languages on their own kin, not of foreign languages on those of a distinct stock. The words of Logan, applied to the influence of Asiatic languages on those of the Indian Archipelago, seem to me quite true if extended to Melanesia:—"The languages imported differed as did those of the natives, and the combinations formed in different places from the contact of the two families varied in the proportions of each which entered into them. But the structure of the native tongues had strong affinities among themselves, and predominated in all these new combinations."

DISCUSSION.

Dr. TYLOR pointed out that whereas philologists such as W. von Humboldt and H. C. and G. von der Gabelentz had dealt with the Melanesian languages on merely literary information, we now have a theory of their relations by one able to speak and write not one but many Melanesian dialects. A paper of similar title, and bearing Mr. Codrington's name, had already been read before the Anthropological Institute on November 22, 1881, but as this paper, though put into shape from Mr. Codrington's materials, was not actually written by him, and hardly embodied his mature conclusions, the Council had wisely delayed publication. Mr. Codrington had now revised his evidence and put his conclusions in a clearer light. The problem of the relation of such a language as the Fijian to the ordinary Polynesian dialects, such as Maori or Tongan, had long presented itself. He himself well remembered when a Fijian Grammar and Dictionary was given to him many years ago by the late Henry Christy, and it appeared to him, from the correspondence of numerals and of the remarkable causative prefix *vaka*, that Fijian was a Polynesian language. Further examination tended rather to countenance the view of the elder Gabelentz, that Fijian and other Melanesian languages were not closely connected with Polynesian, but that traces appeared of a deep-lying common source of both language groups. Notwithstanding the different judgment of the younger Gabelentz and of Meyer, this view seemed sound. But it was now absorbed in an altogether more definite theory worked out by Mr. Codrington, whose argument from common words, and especially from grammatical suffixes, &c., seemed to prove beyond doubt that the Melanesian and Polynesian languages are of one family, but the Melanesian preserved earlier and more perfect forms, the Polynesian being a group of much broken down and comparatively modern dialects spread recently by migrations. That great physical differences should exist between races speaking languages of one family was a state of things not unfamiliar within the Aryan language family, while even English was more and more spoken by people racially different in the extreme.

Professor KEANE remarked that Mr. Codrington's very able paper re-opened the whole question of the mutual relations of the dark and brown Polynesian races, which involved some of the most intricate problems in the whole range of anthropology. His general conclusion, certainly urged with force, and with great, almost wider, knowledge of the subject than perhaps was at the command of any other living writer, seemed at once to place anthropology and philology in the sharpest antagonism. It must be obvious that, if Mr. Codrington is correct in assuming the original unity of Malayo-Polynesian and Melanesian speech, all our conclusions regarding the relative value of physical and linguistic types will have to be reconsidered. Mr. Codrington avoids the difficulty by restricting himself to the linguistic and overlooking the physical

aspects of the question. But it is evident that no final conclusions can be arrived at unless all the factors bearing on the points at issue be duly considered. Perhaps the greatest obstacle to the progress of anthropological studies lies in these partial and one-sided surveys of ethnical domains, which should be examined as a whole, and not as if made up of independent elements. In nature nothing is independent of its surroundings, and in the extremely complex subject of ethnology no safe general deduction can be drawn from the independent study of its separate branches. Least of all can such deductions be accepted when, as in the present case, they involve a direct conflict between the several branches themselves. The anatomy, archæology, and philology of a given division of mankind can point at opposite conclusions only when all the conditions of the problem fail to receive due attention. Hence, even if Mr. Codrington had established the primordial unity of Oceanic speech, it would be rash to argue for the primordial unity of the Oceanic races, in the face of the insuperable difficulties opposed to that conclusion by the consideration of their anatomical differences. These differences are too well known and universally admitted to be here dwelt upon, and for us the question is, How are they to be reconciled with the assumed uniformity of speech? No doubt Mr. Codrington admits great diversity between the strictly Melanesian and Malayo-Polynesian languages. But he argues that the diversity is not fundamental, and that it is more than balanced by the resemblances in vocabulary and structure, which are strong enough to justify the conclusion that all the Oceanic tongues derive from a common stock. So far this view is not novel, for it was put forward many years ago by the elder Von der Gabelentz, and for a time generally accepted on his authority. But it has since been practically given up both by the younger (George) Von der Gabelentz and by Dr. A. B. Meyer, who in their "Beiträge zur Kentniss der Melanesischen Mikronesischen und Papuanischen Sprachen" (Leipzig, 1882), recognise the presence of at least two organic linguistic elements, a Melanesian or Papuan, and a Malayo-Polynesian, in the Oceanic world. But Mr. Codrington not only revives the old theory in all its original crudity, but goes much further, and takes up the startling position that the common stock is not Malayo-Polynesian, as had been taken for granted, but Melanesian, which for our present purpose may be taken as roughly synonymous with Papuan. He argues that the most primitive and archaic forms of the common speech are found amongst the black Melanesians of Fiji, the Solomon, Santa Cruz, and New Hebrides groups, not amongst the brown Polynesians of the Eastern Pacific, or the yellow Malays of the Indian Ocean. So great are the difficulties presented by this view, that it may be fairly described as paradoxical, or at least untenable, unless supported by overwhelming arguments drawn from a comprehensive survey of the whole ground. As Mr. Codrington does not profess to survey the whole ground, expressly excluding the strictly Papuan languages of New Guinea, as well as all ethnical considerations, it might be sufficient for the present to

suspend our judgment and await further evidence before accepting a conclusion running counter to all our preconceived notions of the respective value and relations of physical and linguistic types. For his theory would require us either to assume that in this instance the Melanesian, that is, the lower and unaggressive race, had imposed its speech on the Malayo-Polynesian, that is, the higher and more enterprising races, or else that the assumed common linguistic stock has remained undifferentiated into distinct species throughout countless ages, during which the common ethnical stock has become differentiated into at least three well-marked physical types. Neither hypothesis seems credible. No conditions can well be conceived in which the confessedly inferior dark peoples of the Pacific and Indian Oceans could have everywhere forced their speech on the superior and enterprising lighter populations of those regions. The Melanesians are not, and apparently never were, navigators; whereas both the Malays and the Eastern Polynesians (Samoans, Tongans, Tahitians, &c.) rank amongst the most daring seafaring peoples on the globe. In open praus or frail outriggers they have at all times been accustomed to make voyages of days and weeks from island to island in that watery domain, thus gradually spreading their race and their speech round more than half the world, from Madagascar to Easter Island, from Hawaii to New Zealand. The Polynesian Tongans, we know from Mariner, were in the habit of organising regular warlike expeditions against the Melanesian Fijians some 300 miles distant. The same islanders were often visited by the still more remote Polynesian Samoans, and numerous Polynesian settlements came thus to be planted in Viti Levu, and the other large islands especially in the west of the Fiji Archipelago. The whole local history and traditions of Polynesia are made up of similar warlike or pacific migrations, in which the Polynesians are always the aggressive, the Melanesians the passive element. The same relative position is taken further west by the Malays and the dark Papuans and so-called "Alfuros" of the Eastern Archipelago. Hence it seems impossible to accept the first alternative, that the Melanesians and Papuans imposed their speech on the Malays and Polynesians. Still more difficult is the second alternative of a primeval linguistic stock common to the whole Oceanic domain, still everywhere persisting sufficiently to be recognised as one family group substantially the same, while the primeval race itself has become so profoundly modified that it can no longer be regarded as forming one physical group. That language diverges from its prototype more rapidly than does the human organism, is almost a self-evident proposition, and may be taken as universally accepted by anthropologists. Hence, even supposing that the primitive Oceanic stock started with a common speech, this speech could not possibly have remained fundamentally one, while the stock itself became differentiated into the Papuan, Malay, and Polynesian types. Feeling the full force of this argument, the authors of the already quoted "Beiträge" cogently remark: "Gesetzt noch einmal der Erweis

der Sprachverwandschaft würde voll erbracht, so ergäbe sich unmittelbar ein Widerspruch zwischen Anthropologie und Linguistik. Zwei Sprachsippen sind verwandt; von den Völkergruppen welchen sie zugehören, zählt die eine zu dieser die andere zu jener Menschenraçe. Wie ist das möglich?"

Before admitting the possibility of such a "Widerspruch" it will be well to suspend our judgment, at all events until the whole field has been thoroughly surveyed. Meantime it may be confidently anticipated that the results of such a survey will not tend to confirm Mr. Codrington's conclusions. Almost enough is, in fact, already known to warrant their rejection. The Mafoor, and other true Papuan languages not studied by Mr. Codrington, present a surprising individuality, a phonetic system, and principles of inner structure essentially different from those of the Malayo-Polynesian group. While the latter are almost flexionless, showing little trace even of agglutination, the former have developed a system of internal root modification and a highly intricate order of agglutination, which Meyer and Von der Gabelentz describe as of a "quasi-flexional" character. In general, the so-called "Papuan" or "Melanesian" languages dealt with by Mr. Codrington will probably prove to be mainly Polynesian or Malayan languages imposed on or adopted by Papuan and Melanesian peoples. The more we know of the true Papuan forms of speech, the more they will be found to diverge from the Malayo-Polynesian linguistic type.

Mr. Johnston, Mr. A. Tylor, and Mr. Bouverie-Pusey also joined in the discussion.

Mr. Codrington replied that, with regard to Polynesian influence on the Melanesian languages, it was impossible that the fuller and more complex forms of, for example, the Fiji verb, could have been learnt from the Polynesians, whose language is evidently a late and simplified form. The Motu of New Guinea, said to be Polynesian, is not so, for its vocabulary shows grammatical forms not known in Polynesia. It is a Melanesian language as much as any language of the Solomon Islands. The extraordinary similarity of all the Polynesian languages shows them lately distributed into their present seats. The diversity of words in Fiji with the same signification, remarked on by Mr. Johnston, could be explained there, or elsewhere in Melanesia, by separate and various settlements having little intercourse, or by the substitution of new words which for various reasons it had become in the native view improper to employ.

MARCH 11TH, 1884.

Professor W. H. FLOWER, LL.D., F.R.S., *President, in the Chair.*

The Minutes of the last meeting were read and signed.

The following presents were announced, and thanks voted to the respective donors:—

FOR THE LIBRARY.

From the UNITED STATES GEOLOGICAL SURVEY.—Bulletin, No. 1. Second Annual Report, 1880-81. Monograph No. 2. Tertiary History of the Grand Cañon District, with Atlas.

From the UNITED STATES GEOLOGICAL AND GEOGRAPHICAL SURVEY OF THE TERRITORIES.—Twelfth Annual Report, 1878. Survey of the Territories of Wyoming and Idaho. 2 volumes, with Maps and Panoramas.

From the GERMAN ANTHROPOLOGICAL SOCIETY.—Correspondenz-Blatt. 1884, No. 3.

From the ACADEMY.—Atti della R. Accademia dei Lincei. Vol. VIII, Fas. V.

From the ASSOCIATION.—Journal of the East India Association. Vol. XVI, No. 2.

From the INSTITUTION.—Journal of the Royal Institution of Cornwall. Vol. VIII, Part I.

From the SOCIETY.—Journal of the Asiatic Society of Bengal. Vol. LII, Part I, Nos. 3, 4.

—— Proceedings of the Royal Geographical Society. March, 1884.

—— Mittheilungen der Anthropologischen Gesellschaft in Wien. XIII Band., Heft. 3, 4.

—— Transactions of the Society of Biblical Archæology. Vol. VIII, Parts 1, 2.

—— Bulletin de la Société d'Anthropologie de Bruxelles. Tom. II, Fas. 1, 2.

From the EDITOR.—"Nature." Nos. 748, 749.

—— "Psyche." March, 1884.

—— Revue Politique et Littéraire. Tom. XXXIII, No. 10.

—— Revue Scientifique. Tom. XXXIII, Nos. 9, 10.

—— "Science." Nos. 55, 56.

—— The Science Monthly. No. 5.

The election of W. AYSHFORD SANFORD, Esq., was announced.

Mr. W. J. KNOWLES read a paper "On the Antiquity of Man in Ireland," which was followed by a discussion in which the PRESIDENT, Mr. LEWIS, Mr. PARK HARRISON, Mr. ATKINSON, Mr. RUDLER, and Dr. GARSON took part.

The following paper was read by the author:—

On the "LONGSTONE" and other PREHISTORIC REMAINS in the ISLE OF WIGHT.

By A. L. LEWIS, F.C.A., M.A.I.

THE Isle of Wight, the Roman remains in which have been recently described by our colleagues, Mr. F. G. H. Price, F.S.A., and Mr. J. E. Price, F.S.A., is not destitute of remains of an earlier period. Some of these, indeed, have been explored and described in our "Journal" by the gentlemen already named, but they were in the eastern half of the island,[1] whereas those to which I propose to draw your attention to-night are in its western half.

On the downs above Mottistone (a place on the high road to and five miles east of Freshwater) is a single upright stone called the "Longstone." It is about 13 feet high, 5 to 7 feet broad, and 4 feet thick; and 4 feet north-east from it lies a flat stone, 9 feet long, 4 feet broad, and 2 or more feet thick. These stones have been thought to be the remains of a dolmen, or cromlech, but I see no reason to suppose that any other stones were ever there, and I think that we still have the whole monument as it was originally designed, unless indeed the flat stone may have been shifted; the upright stone is too high to have been a supporter of a dolmen, and the flat stone is not long enough to have matched the upright one if set on end itself. Father Smiddy speaks of upright stones with flat stones by them, in Ireland, as having been judgment-seats of the Druids, but what his authority for that statement is I do not know. To the east of the "Longstone" is a fine tumulus, marked on the ordnance map as "Black Barrow," and to the north-east is a cleft in the Downs; the flat stone may have served as an altar on which the sun might shine through this cleft at its rising, or it may have been a judgment-seat, as Father Smiddy suggests, or the two stones may be simply a memorial, with or without interment. Colonel Godwin-Austen says of the stones erected by the Khasias (India) that upright stones represent the male element, and flat stones in front of them the female element.[2]

A sandy lane leads from the high road up to these stones, and, in the channel formed by rain in the middle of this lane, I found a good core, a flint stone chipped all round and possibly used as a hammer, and two other fragments of worked flint.

[1] "Journ. Anthrop. Inst.," vol. xii (1882), p. 192.
[2] *Ibid.*, vol. i (1871), p. 122.

Between two and three miles east-north-east from these stones, in the valleys between Galliberry, Idlecombe, Newbarn, and Rowborough Downs, are various earthworks, which are marked on the ordnance maps as "British villages." Our friend Mr. Flinders Petrie, who had previously visited and measured some of these works, hearing that I was in their vicinity, drew my special attention to them, saying that he believed them to be not villages but cattle-drives or game-traps; and, having examined them carefully, I think there can be no doubt that he is quite right. They consist of a series of banks running across the narrow deep valleys, and even partly up the hills on each side, so as to prevent their being turned, each bank having about the middle of its lower side a pit; one of these pits is more than 40 feet in diameter, which is too large for a pit dwelling. Three of these valleys converge towards one near Calbourne, where there is a rectangular double earthwork nearly obliterated, which, if of the same date, may have served as a pound in which to keep any animals taken alive; it seems too slight and too much commanded from the hills to have been a defensive work. What kind of animals, and in what numbers, must have existed to make it worth while to construct such works for their capture I do not know; but I suppose the system was for all the able-bodied inhabitants, canine as well as human, to turn out at intervals, and, having formed a cordon round a great part of the country, to drive all that it contained towards the select slaughterers concealed in the pits or behind the banks —a plan which, with some variations, used to be adopted by the natives of Australia.

On the high ground between Brixton and Cheverton Downs there is, however, a circular bank of a different description, about 6 feet high inside and 80 feet in diameter, without any ditch, but constructed with the earth taken from inside it, and this probably enclosed a few huts. I found no pits inside it, but the dwellings (if any) might not have been of the pit description. Although close by the trackway it is not seen till it is nearly reached, and there are tumuli very near it; at the foot of one about half-a-mile off, I picked up a worked flint which may have served as a fish-hook. This earthwork is about a mile and a half due east from the "Longstone."

The other fragments of worked flint exhibited were picked up on the surface in various parts of the neighbourhood. The bottom of a vessel, apparently Romano-British, I picked up on sloping ground above Puckaster Cove, Niton. Black says landslips have exposed Romano-British pottery at Barnes, which is about six miles along the coast to the west, and this piece has probably been turned out in the same way. I could not

find any more, though I made some search; but even this may not be altogether valueless, as some antiquaries have endeavoured to identify Puckaster Cove with the Roman Portus Castrensis.

The following paper was read by the Director:—

On the Cromlech (*Stone Circle*) *of* Er-Lanic.

By Rear-Admiral F. S. Tremlett, F.G.S.

[With Plate III.]

The island of *Er-Lanic* ("the little *Lande*"), which is also known by the name of *Innis Tessier* ("the Weavers' Island"), is small and uninhabited, and is situated among the rocks and rapid currents of the Archipelego of the Gulf of the Morbihan. It has a superficial area of rather less than two acres, and is situated to the south of Gavr' Innis; to the west of the Island of La Jument; to the east of the Ile Lonque, and to the north of the headland of Pen Bé ("Point of the Tomb"), in Arzon.

It is rather a difficult matter to land on this small island, and in reality it is very rarely visited, it being both uncultivated and uninhabited. Even the fishermen know it only from the fact of its being situated in close proximity to a dangerous reef of rocks, the Tisserands ("weavers"), which they avoid. If they ever land there, it is simply to cut down and bring away a few ferns; but of these rare visitors very few have ever given themselves the trouble of walking round this insignificant island; this is why the remarkable megalithic monument which is situated on it remained so long undiscovered.

From the height of the remarkable tumulus on Gavr' Innis, Dr. de Closmadeuc, President of the Société Polymathique du Morbihan at Vannes, who has become its proprietor, observed what appeared to him to be a group of menhirs on this small island, which decided him to go over to it in his boat at low water. On landing, he was not long in discovering amongst the gorse and genet which grow so abundantly there, that he had before him one of those early monuments which are so rare, and so little known in Brittany, namely, a megalithic *Cromlech*, or circle of stones.

On the centre of this island there is a natural rocky eminence, to the south-east of which, and distant from it about 25 yards, and situated on that part which slopes towards Arzon, will be seen a cromlech (circle) which is continued down to the beach; it is composed of 60 menhirs, forming a circle of about 200 yards

in circumference; its diameter from east to west is about 65 yards, that from north to south is 58 yards. Some few of the menhirs composing this circle remain still upright, but the greater number of them have fallen, and lie concealed by the long grass and gorse bushes. The distance between them is so inconsiderable that they nearly touch each other; in fact, in some parts they somewhat resemble the flat tombstones of a cemetery. Only four of the menhirs remain upright: these are to be found on the north-western side of the circle; their medium height is about 10 feet, but one of the fallen ones is really colossal: it is broken in halves, and it measures 18 feet long, having a thickness of 6 feet.

A very singular fact is that only one-half of this circle is on the island, the other half being on the beach in consequence of the sea having encroached on the land on its south-western side. When the tide is up, this part of the monument is covered with water, and consequently the complete circle can only be seen at low water.

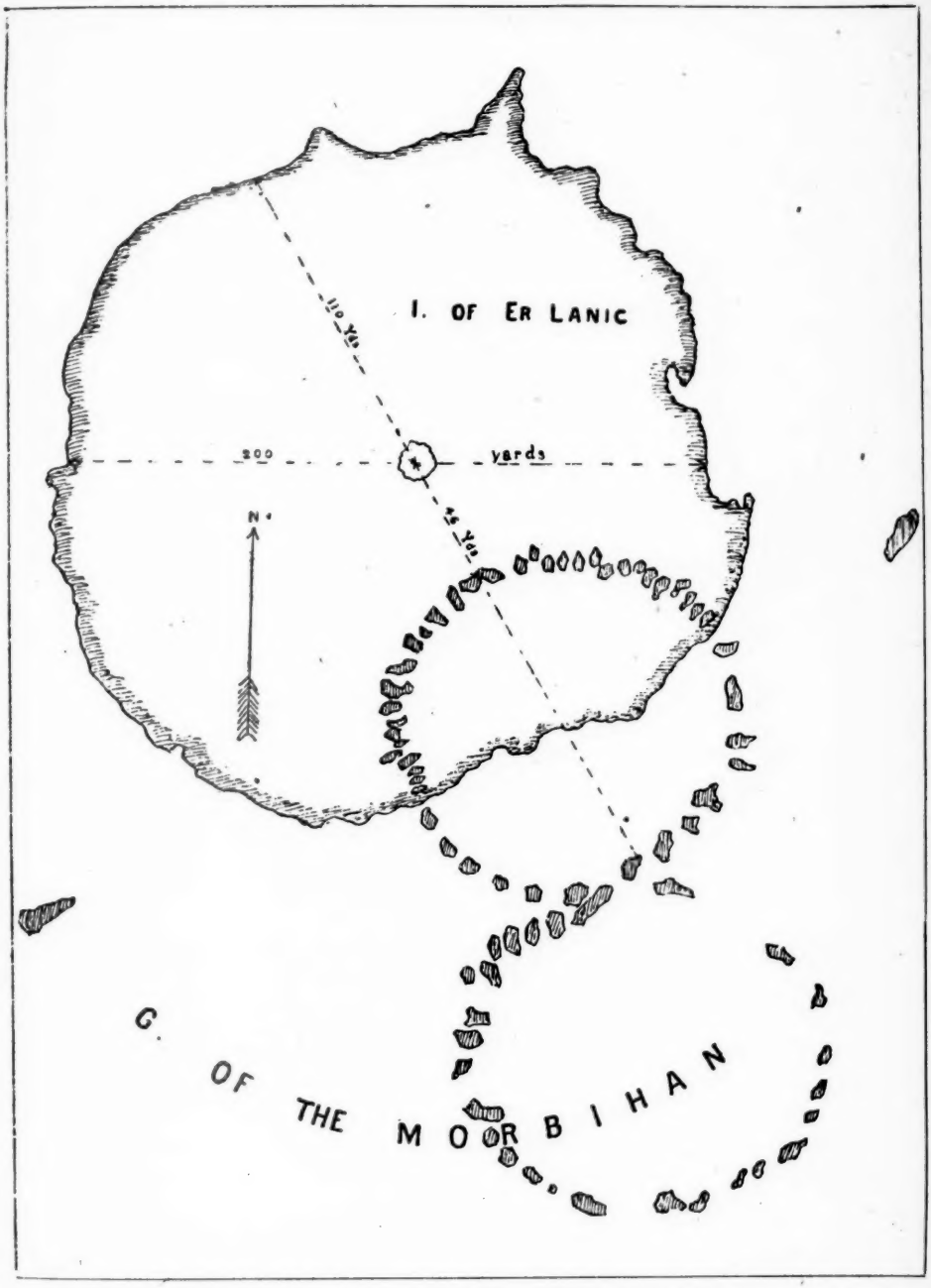
The discovery of this megalithic monument was first made by Dr. de Closmadeuc in 1866, but he frequently visited it afterwards for the purpose of studying it. On each visit he found within this cromlech a sufficient quantity of stone implements and shards of pottery to fill his baskets. These relics were of the following kinds:—

First. An enormous quantity of shards of pottery, which in form and paste resembles that which has been found in the Celtic monuments in Brittany. The paste of some of it was coarse and black, it having been mixed with grains of silex, and badly fired; some of it had been carefully made. Its surface was red, and it had on it the usual ornamentation resembling that found on some of the urns from the dolmens. Numerous samples of the pottery from Er-Lanic are now in the cases of the Archæological Museum at St. Germains, near Paris.

Secondly. A very considerable quantity of worked flint instruments, consisting of long knives (or flakes), their forms being prismatic, triangular, and quadrangular; scrapers and sharp-pointed flint chips, nuclei and circular stone hammers, &c. The objects in flint were found by thousands, but only two flint *arrow-heads* were discovered.

Thirdly. Hundreds of celts or stone axes, of every shape and of various dimensions, were also found here. The greater part of them were of diorite, a few were of quartz, agate and fibrolite, but nearly every one of them had been broken.

Fourthly. Stone mortars and granite querns, being of the same patterns as those which have been found in the dolmens of the Morbihan. One of the mortars had been hollowed out



MAP OF I. OF ER-LANIC, MORBIHAN, SHOWING STONE CIRCLES.

on *two* of the sides of the stone; it showed evident signs of its having been in use for a long time, it being much worn.

Lastly. A great number of smooth water-worn pebbles, having a score cut out on their sides for attaching them, they having been evidently intended to serve as sinkers to fishing-nets, which system still exists to this day on the sea coast of the Morbihan.

In order to obtain these objects it was only necessary to remove the surface pebbles which had accumulated and had been deposited *within* the part of the cromlech on the beach. The part on the island was afterwards examined; to do so it was merely necessary to clear away the surface stones and humus, beneath which there were found enormous quantities of broken celts, instruments of silex, and shards of pottery. Dr. de Closmadeuc frequently revisited this small island, accompanied by his workmen, bringing away with him on each occasion ample quantities of these remains; indeed it is only requisite to follow with the eye the thin and superficial upper stratum of the island to be convinced that there exists below it literally a stratum of broken stone implements and shards of pottery, which stratum to this day has only been partially examined.

Dr. de Closmadeuc revisited Er-Lanic during the month of October, 1876, at the time of one of the *lowest* spring tides, and perceived very distinctly that beyond the cromlech (circle) which he had discovered (the whole of which was then visible), there existed a further circle attached at a tangent to the first one, it being also of about the same dimensions as the first one, seven or eight of its menhirs being on the beach; the remainder, although submerged, had their upper part on a level with the water, being perfectly visible; at its further extremity there is a colossal menhir, which then projected about 3 feet above the level of the water: it is this menhir which is marked on Beautemps Beaupré's chart of 1820 as being "a rock" to be avoided; the fishermen to this day call it *Carec-er-go*, or the "Blacksmith's rock."

There exist, therefore, in reality, *two* cromlechs or circles here, which together resemble the figure of 8 (Plate III), one-half of the first circle being situated on the island, and the other half being covered at high water; the second circle being under water at all times of the tide. Dr. de Closmadeuc further discovered at the same time that there are two enormous menhirs to the right and left of the double circles, which evidently belonged to the system; they are always under water.

The submersion of these circles is probably due to the following causes:—Firstly, to a gradual subsidence of the land; and secondly, to the erosions caused by the rivers of Auray, Vannes,

and Noyalo, which empty themselves into the Morbihan, and carry away the softer strata, leaving the harder rocks which now form the islands of this inland sea; this process is still ever going on. The volume of the discharge of water, and the *scour* of the gulf, are such, that at times boats cannot stem its rapidity, and that, in fact, in some parts of it, after heavy rains, they become perfectly unmanageable. It is also a well-authenticated fact that the western coast of France has for a series of centuries been subsiding: the proofs of it are not wanting. In the bay of Audierne, when the weather is fine and the sea calm, the remains of ancient constructions can be plainly seen at a distance from the shore *beneath the waters*, which has given rise to many legends, especially that of the destruction of the city of Is. At Quiberon, the alignements of the menhirs of St. Pierre not only run down to the beach, but are continued under the sea water. Some of the menhirs are still standing upright below its level, and are distinctly visible at low water.

Description of Plate III.

Map of the Isle of Er-Lanic, in the Gulf of Morbihan, showing the position of the two stone circles, or cromlechs, and of the two submerged menhirs.

Discussion.

Mr. Lewis said it had been known for some time that this half-submerged circle existed, and the Rev. W. C. Lukis had mentioned it to the Society of Antiquaries, but he did not think so many details had been given about it before. The outlying stones were new to him, and were most important; for it was seen from the plan that they had a reference to four notable points of the compass, namely, a large stone to the north-east, another to the south-west, a rocky eminence to the north-west, and the submerged circle to the south-east or south. Those facts might be compared with those stated in his own paper on the "Relation of Stone Circles to Outlying Stones," &c., published in their *Journal* in November, 1882. In so far as these references were to the north-east, south-east, south-west, and north-west, rather than to the east, south, west, and north, they followed the Chaldean method of orientation, as opposed to the Egyptian, and this might some day be found to have some anthropological significance. The great quantities of broken stone axes and flakes and pottery found in and about the circles were also of great importance. Either the circles were set up on the site of an old implement factory or the flints and pottery were taken to and broken in the circles, which seemed to him the most likely. He could hardly suppose that so much pottery would be found amongst the *débris* of a flint factory; on the other hand, fragments of vessels, used and ap-

parently broken in some religious ceremony, were found in circles near the first cataract of the Nile (*Academy*, 18th November, 1876), in India (Forbes Leslie's "Early Races of Scotland"), and he believed nearer home also; but if the implements and pottery were brought to the circles and broken there it showed that the circles belonged to a much earlier period than Mr. Fergusson had assigned to our rude stone monuments. The submersion of the circles also indicated age, though Mr. Peacock had shown much ground for believing that great subsidences have taken place round the northern French coasts within the last two thousand years; and it was of interest in another way. It had been thought that as the stones on Gavr Inis were not native to that island they must have been floated over to it on rafts; but it would now seem that when the remarkable monument upon that island (which he had visited in 1867) was constructed the island might at some point have been connected with the mainland, though, indeed, water carriage might have been rather a help than a hindrance. The fact that the stones of the circles were still *in situ* suggested that their submersion was due to subsidence rather than to erosion.

The following paper was read by the Assistant-Secretary :—

On a PORTION *of a* HUMAN SKULL *of supposed* PALÆOLITHIC AGE *from near* BURY ST. EDMUNDS. By HENRY PRIGG, Esq.

[WITH PLATES IV, V, AND VI.]

THE fragment of human skull which I beg to submit to your notice (Plate V) was found in November, 1882, at a depth of 7½ feet from the surface, in a pit then recently opened for brick-earth by the side of the high road from Bury St. Edmunds to Saxham, and in the parish of Westley.

It includes a triangular central portion of a frontal bone from a little above the *foramen cæcum;* about 5 inches of the coronal suture; and a little over 2 inches of the sagittal, with the anterior third of the left parietal, and a small portion of the right.

The sutures are closed internally, but not completely without. The bone is very slight, the two *tabulæ* being separated by a very thin *diploe*. The thickest part of the fragment is only one-fourth of an inch.

The skull, judged from what remains of it, would appear to have belonged to an undersized, poorly-developed individual of middle age, probably of the female sex. The length of the frontal portion preserved is externally 3½ inches, which in a normal skull would indicate that its lowest point would approach the upper margin of the glabella;[1] if so, I think it

[1] Position as assigned by the late Dr. J. Barnard Davis.

would be a sign that the anterior vault of the cranium was somewhat low.

It will be seen that the bone has suffered much decay, and when it reached my hands on the afternoon of its discovery, it was destitute of animal matter, and exceedingly friable.

Of the great antiquity of this fragment I think there can be little question. A glance at the section of the country (Plate VI, fig. 1) and of the pit (Plate VI, fig. 2) will show that the deposit of red loam in which it was found must have been formed long anterior to the complete excavation of the valley of the Linnet to the south, and at a time when at least flood-waters laden with much earthy matter flowed in some volume over what is now within a few feet of being the highest point of the country intervening between the valleys of the Linnet and the Lark. Unfortunately for the satisfactory demonstration of its high antiquity, the fragment was not taken from its matrix with my own hands; nevertheless I was early the next day at the pit, and most carefully examined the spot from which it came, assuring myself of two facts, namely—that there was no indication of a grave, or other disturbance of the deposit, and that no other bones remained therein in the neighbourhood of where the skull fragment had lain. The fact of the occurrence of the latter in the undisturbed loam-bed induced the intelligent labourer who directed the excavation to look upon it as something extraordinary, and to preserve it, and bring it to me.

The section exposed in the pit at the time of this visit was about 11 feet in depth, and a description of it will suffice for many of the other pits that have been worked in the same locality.

First, there is a surface-soil of from a foot to 18 inches. Then red loam somewhat sandy, in which is mingled, in some sections, chalky detritus of the nature of "cap," or, as it is called here, "dead loam," to a depth of 8 feet. Below this is a bed of compact brown loam[1] of varying thickness, clean above, but filled with large angular flint gravel towards its base, which generally reposes upon the chalk. The exception to this is, that in one or two places a bed of laminated argillaceous sand of some thickness underlies the loam and intervenes between it and the chalk. These deposits are of more or less limited extent, and are formed in pits or pockets, eroded in the old chalk surface, probably by the agency of water charged with carbonic acid. All over the fields hereabouts, except where the deposits of

[1] It is a question whether there is any real difference between the two loams in this case, but for convenience of description I have described them according to colour. It is probable that the subaerial waters percolating the surface subsequent to the deposition of the loam may have altered the character of the upper part of the bed by dissolving out of its chalky constituents.

loam occur, the chalk is found within a few feet of the surface, whilst in places on the slope of the valley of the Linnet it is exposed.

In the pit where the interesting discovery was made it was found that the loam deposit dipped under the roadway, and further working was abandoned, but elsewhere the men entirely clear out the pockets.

My attention was first drawn to the locality by the discovery in two of the pits of grinders of the mammoth (*Elephas primigenius*), and subsequently, in 1877, to the somewhat unlooked-for finding of a flint implement of archaic type in a pit in the same field as that in which the skull was found, but at a slightly lower level. (Pit No. 1 on section, fig. 1, Plate VI.)

This year another deposit has been opened up in pit No. 3, in which the loam-bed is worked to a depth of 18 feet from the surface, and from which I have already obtained three flint implements. One of these, with the implement first found, I have the honour to submit to the meeting (Plate IV). A section of this pit is given in Plate VI, fig. 3.

The first (Plate IV, fig. 1), referred to above as coming from pit No. 1, is a fine specimen of a "chopper" or "side scraper," 6½ inches long, approaching in form those found at La Moustier. It is a heavy implement wrought with few blows to an edge and point, and upon its right-hand side is retained a considerable portion of cortical. It was found at a depth of 10 feet from surface, at the base of the brown loam. The site of its discovery was carefully re-examined by myself, in company with Dr. Evans and Professor McK. Hughes, in the spring of 1880.

The second implement (Plate IV, fig. 2) came from the deep pit No. 3 (Plate VI, fig. 3), in the adjacent field, but only a few yards to the westward from No. 1. It is an oval of 5¼ inches long, of the type most usually found in the gravel deposits of the Grindle and elsewhere in the valley of the Lark, and it occurred in the red loam at 7 feet from the surface. Previous to its entombment in the deposit, it had been much exposed to the weather, and is coated with a dense white *patina*, which in places has undergone subsequent decomposition.

The other implements found here occurred at a slightly lower level in a seam of stones, which in this instance separated the red from the brown beds. Like the first they have lain exposed upon the surface. In form the second resembles a rude scraper, whilst the last found is a small ovate implement.

I look with very considerable interest to the further development of this pit (No. 3), as it is situated only a few yards to the south of another deposit of a similar nature worked some thirty years ago, in which a labourer, who for many years worked

there, assured me that they found the entire skeleton of a man at about 8 feet from the surface, in solid brick earth, and near him the tusk of an elephant.

A few words, in conclusion, as to the position of this flint implement station. It is situated upon the broad tongue of land which intervenes between the valleys of the Lark and Linnet, and at about one-and-a-half miles from the junction of the latter rivulet with the former at the south end of Bury St. Edmunds. The height of the surface at pit No. 2 is ascertained to be 202 feet above the Ordnance datum, and about 100 feet above the level of the Lark at Fornham. The ground from the pits to the town rises slightly until the Cemetery is reached, when it falls to the valley of the Lark. Besides this slight rise to the east, and a corresponding one to the west, upon which the village of Westley is situated, no higher ground commands the station for over a mile.[1]

For several years past, flint implements have been found in the valley deposits of the Lark at Bury, and at the entrance of the valley of the Linnet, but never at a higher level than 45 feet above the stream.

Description of Plates IV, V, and VI.

PLATE IV.

Fig. 1. Flint implement found in pit marked No. 1 in fig. 1, Plate VI.

Fig. 2. Flint implement found in pit marked No. 3 in fig. 1, Plate VI.

PLATE V.

Two views of a fragment of human skull found in November, 1882 in a brick-earth pit marked No. 2 in fig. 1, Plate VI, at a depth of 7½ feet from the surface.

PLATE VI.

Fig. 1. Section from the Valley of the Linnet to that of the Lark. A, Valley of the Linnet; B indicates pit in which the skull was found; C, the pits which yielded the teeth of mammoth; D, that in which the flint implement, fig. 1, Plate VI, was found; E has yielded other flint implements; at F an elephant's tusk was found; G indicates the Newmarket Road; H, Tay Fen Valley, dry; J, the road to Fornham; and K the Valley of the Lark. Dotted lines at the base show a vertical scale of 1,000 feet and a horizontal scale for one mile.

[1] It will thus be seen that a shallow trough is here formed across the ridge, which probably represents an old channel of the Linnet, which joined the valley of the Lark by way of the valley of Tay Fen, now waterless except in its lowest level.

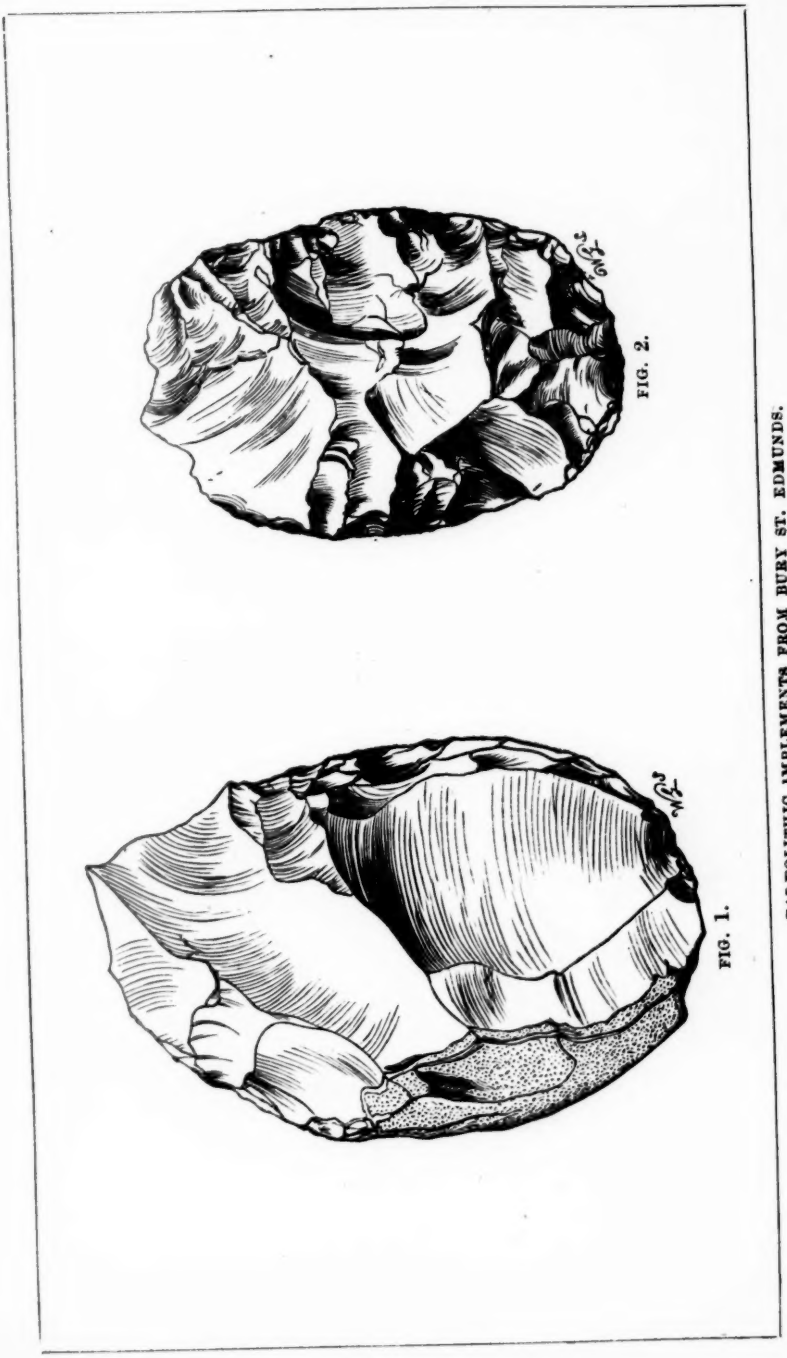
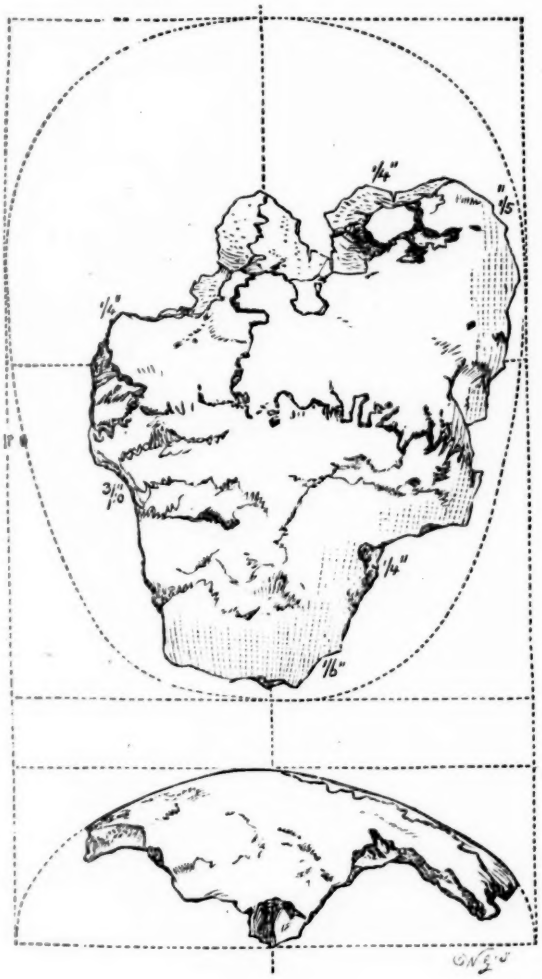


FIG. 2.

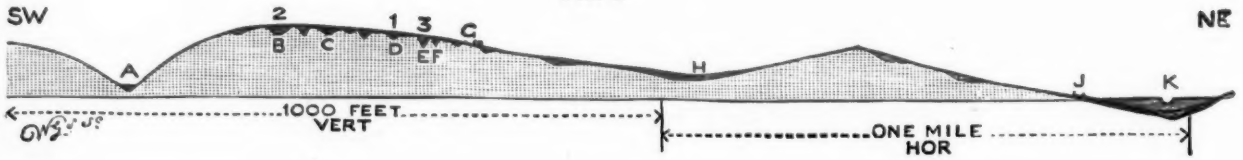
FIG. 1.

PALEOLITHIC IMPLEMENTS FROM BURY ST. EDMUNDS.



FRAGMENT OF HUMAN SKULL OF SUPPOSED PALÆOLITHIC AGE, FOUND NEAR BURY ST. EDMUNDS.

FIG. 1.



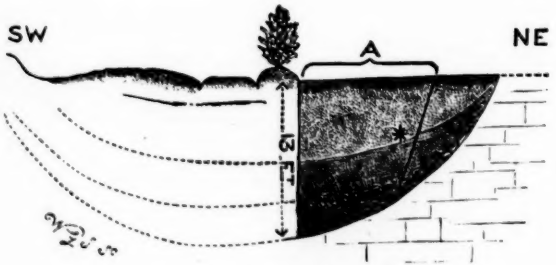


FIG. 2.

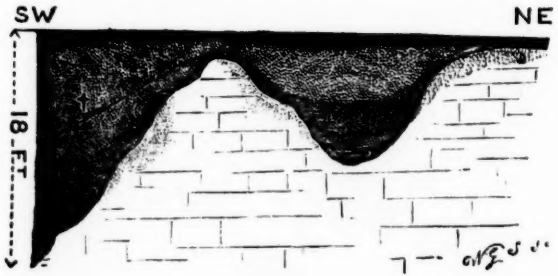


FIG. 3.

SECTIONS NEAR BURY ST. EDMUNDS SHOWING POSITION IN WHICH PALÆOLITHIC IMPLEMENTS AND FRAGMENT OF HUMAN SKULL WERE FOUND.

Fig. 2. Section of the pit No. 2 in fig. 1. A indicates the section exposed in the workings in November, 1882, and * shows the position of the human skull in the red bed.

Fig. 3. Section of the pit No. 3 in fig. 1, and of an adjacent pit; † indicates the position of the flint implement, Plate IV, fig. 2.

MARCH 25TH, 1884.

Professor W. H. FLOWER, LL.D., F.R.S., *President, in the Chair.*

The Minutes of the last meeting were read and signed.

The following presents were announced, and thanks voted to the respective donors.

FOR THE LIBRARY.

From the AUTHOR.—Abstract of an Account of Recent Archæological Excursions in Wisconsin and Ohio. By Frederick W. Putnam.

—— Cimetière Gaulois de Mareuil-le-port. By M. le Baron J. de Baye.

From the ACADEMY.—Actas de la Academia Nacional de Ciencias en Cordoba. Tom. V, Ent. 1.

—— Atti della R. Accademia dei Lincei. Transunti, Vol. VIII, Fas. 6.

From the SOCIETY.—Proceedings of the Literary and Philosophical Society of Liverpool. Vols. XXXV–XXXVII.

—— Proceedings of the Royal Society, No. 229.

—— Proceedings of the Society of Antiquaries of Scotland, 1882–3.

From the EDITOR.—The American Antiquarian, Vol. VI, No. 2.

—— Bulletino di Paletnologia Italiana. Nos. 1, 2, 1884.

—— Matériaux pour l'Histoire de l'Homme. March, 1884.

—— "Nature." Nos. 750, 751.

—— Panjab Notes and Queries. No. 5.

—— Revue Politique et Litteraire. Tom. XXXIII, Nos. 11, 12.

—— Revue Scientifique. Tom. XXXIII, Nos. 11, 12.

—— "Science." Nos. 57, 58.

Lord WHARNCLIFFE exhibited a very fine stone implement recently found on his estate in the North Riding of Yorkshire, upon which Lieutenant-Colonel GODWIN-AUSTEN offered some remarks.

Mr. G. M. ATKINSON exhibited some flint flakes from Southend, upon which Mr. HILTON PRICE made some observations.

Mr. LAISHLEY exhibited and described a large collection of Maori heads carved in Cowrie gum. The PRESIDENT and Professor THANE joined in the discussion which this exhibition raised.

The following paper was read by the author:—

NOTES *upon some* ANCIENT EGYPTIAN IMPLEMENTS.

By F. G. HILTON PRICE, F.S.A., F.G.S., Treasurer Anthrop. Inst.

[WITH PLATE VII.]

IT is not my intention to read a paper this evening upon Egyptian implements generally, but merely to describe a small number in my possession. To discuss the subject at length would occupy more time than I have at present at my disposal, and would perhaps be beyond the limits of our "Journal."

Until lately no implements of stone had been discovered in Egypt, but during the last few years records of important finds have been laid before our Institute by Sir Richard Owen, Captain Burton,[1] Sir John Lubbock,[2] Mr. Jukes-Browne,[3] General Pitt Rivers,[4] &c. It seems, therefore, most probable that Egypt at a remote period passed, like many other countries, through its stone age; but we have no information as to how long it lasted, or when it was superseded in that country by bronze and iron. I do not intend to imply that Egypt had ever been through such a stone age as had Denmark, but there is no doubt stone was used during the bronze period, and probably for many purposes during that of iron.

There is no record, on the monuments, of the ancient Egyptians making use of stone implements. Still, they had once used stone for ordinary purposes, and we find a survival of it for certain ceremonies lingering into the historic period. For instance, upon the authority of Herodotus and Diodorus, we learn that the embalmer used a knife made of the Ethiopic stone, which is described as being of exceeding hardness, and capable of taking a keen edge; and the man who made the first incision in the side of the corpse, for the purpose of extracting the intestines, had to run away with all speed even from his colleagues, as it was the custom for them to

[1] "Flint Flakes from Egypt," by Captain Burton ("Journ. Anthrop. Inst.," vol. vii, p. 323).

[2] "Notes on the Discovery of Flint Implements in Egypt," by Sir John Lubbock, Bart., F.R.S. ("Journ. Anthrop. Inst.," vol. iv, p. 215).

[3] "On some Flint Implements from Egypt," by A. J. Jukes-Browne, F.G.S. ("Journ. Anthrop. Inst.," vol. vii, p. 396).

[4] "On Discovery of Chert Implements in Stratified Gravel in the Nile Valley near Thebes," by Major-General Pitt Rivers, F.R.S. ("Journ. Anthrop. Inst.," vol. ii, p. 382).

throw stones at him and to load him with curses. M. Passalacqua discovered in a tomb close to a mummy a small box, which contained nine flint implements, presumably used for making incisions into the flanks of the dead.

Yet, notwithstanding they used flint for this purpose, at the same time they employed bronze, in the form of a long rod, with a hook at the end for extracting the brain, which was done by passing this instrument through the nostrils.

Then, again, another survival of the use of flint is shown by the knives for circumcision, which were employed for that purpose in Egypt as well as in Syria, being made of that material. They likewise used flints as points to their arrows for fowling purposes, and it has been supposed that they even used flint spears in warfare, though none have hitherto been found; and it is likewise probable that they made use of flint scrapers for preparing skins and dressing cloth. Flints were also used in some agricultural processes in ancient times: although I am unaware of the habit at the present day in Egypt, yet in many parts of the East they are still fixed into large wooden machines, which serve the purpose of the harrow.

I have frequently seen in Egyptian collections specimens of large flat and broad instruments of green basalt, usually being in the form of an animal (there is one of these in the British Museum), but for what particular purpose these weapons were used I am quite unable to say.

There is a good woodcut of flint knives in "The Ancient Egyptians," by Sir. G. Wilkinson, Vol. II, p. 261; the originals are in the Berlin Museum. One of them has a handle of flint, and is a well-finished implement. On the same page are the following remarks upon stone weapons by Dr. Birch, which I think worth adding, as he is our greatest authority upon anything relating to Ancient Egypt:—"A beautiful little stone saw was found by Prof. Hayter Lewis at the Pyramid of Zowet-el-Arrian, built under one of the first six dynasties.

"The various stone knives in the museums of Europe are of pyromachous silex, of a light-brown, not dark, colour; and they were often deposited in baskets near the mummies, and fragments or slices of flint have been discovered in the tombs. Arrow-heads, resembling those of the stone period, have also been discovered in a tomb of the twenty-second dynasty, or the ninth century B.C., and other leaf-shaped pieces, apparently for the same use. Great quantities of flint instruments have also been found in the neighbourhood of Egyptian temples and stations in the peninsula of Sinai, in Arabia—amongst them stone hammers; knives of dark

steatite are also known, and the blade of a dagger of pyromachous silex."

The Turin Museum possesses a knife of similar form to that of Berlin, made of pyromachous flint; at Leyden there are three. Besides these are several other well-known flint knives of different forms in the various museums on the Continent and at the British Museum.

General Pitt Rivers[1] has a remarkable specimen of a flint knife found at Kom Ombos in 1874; it was probably used, as were the preceding ones, for embalming. It is 12 inches in length.

General Pitt Rivers considers it quite possible that the ancient Egyptians may have used flint or chert implements for cutting the figures and hieroglyphics in the sandstone used for the temples, and whilst he was at Koorneh he picked up a piece of the sandstone of which the temple is built, and in the course of half-an-hour cut out the head and shoulders of a man with a piece of flint; the advantage of such a tool being that it renews its own edges whilst in use. His discovery of flint implements *in situ* in the Nile Valley tends to prove that they are contemporaneous with the deposition of the gravel, and it goes far to upset the old theory of M. Chabas that there never was a stone age in Egypt.

Bronze is a metal which the ancient Egyptians largely manufactured into swords, daggers, javelins, spear-heads, arrow-heads, axes, adzes—indeed, all manner of cutting instruments were made of this metal, and it continued in use long after other nations had adopted iron or steel. There is a representation on a monument at Thebes, quoted by Sir G. Wilkinson, of a butcher sharpening his knife upon a steel, which is painted blue, in marked contrast to the red-coloured blades of the bronze implements.

Dr. Evans, however, considers the object coloured blue as more probably a whetstone than a steel.

In the British Museum there is exhibited a most interesting collection of carpenters' tools, mostly of bronze, found in a basket at Thebes: and figured in Wilkinson's "The Ancient Egyptians," Vol. I, p. 401; they consist of chisels, awls, drill bows, including the nut of wood belonging to it, for pressing against the chest as a protection to prevent the drill injuring the person using it. There was also found with them a vessel for holding the oil, made out of a cow's horn, a bronze saw, mallet, a bag of skin, supposed to have been used for holding nails, and a hone of stone for sharpening the implements.

Swords are of very rare occurrence, and few if any exist: the

[1] See "Journ. Anthrop. Inst.," vol. ii, p. 386, with plate.

blades were long and curved; there is a model of one in the Boulak Museum measuring 1·30 metres in length, and a few in Continental museums.

The *khopesh* is a kind of scimitar in bronze, and was used by the Egyptians and their allies the Etruscans.

As to the succession of the two metals, bronze and iron, among the ancient Egyptians, there is considerable diversity of opinion among those who have studied the subject. Sir Gardner Wilkinson, judging mainly from pictorial representations, thinks that the Egyptians of the early Pharaonic age were acquainted with the use of iron, and accounts for the extreme rarity of actual examples by the rapid decomposition of the metal in the nitrous soil of Egypt. M. Chabas, the author of a valuable and interesting work upon primitive history, mainly as exhibited by Egyptian monuments, believes that the people of Egypt were acquainted with the use of iron from the dawn of their historic period, and upwards of 3,000 years B.C. made use of it for all the purposes to which we now apply it, and even prescribed its oxide as a medicinal preparation. M. Mariette, on the contrary, whose personal exploration entitles his opinion to great weight, is of opinion that the early Egyptians never really made use of iron, and seems to think that from some mythological cause that metal was regarded as the bones of Typhon and was the object of a certain repugnance. M. Chabas himself thinks that iron was used with extreme reserve, and, so to speak, only in exceptional cases. This he considers to have been partly due to religious motives, and partly to the greater abundance of bronze, which the Egyptians well knew how to mix so as to give it a fine temper. From whatever cause, the discovery of iron or steel instruments among Egyptian antiquities is of extremely rare occurrence, and there are hardly any to which a date can be assigned with any approach to certainty. The most ancient appears to be a curved scimitar-like blade discovered by Belzoni beneath one of the sphinxes at Karnak, and now in the British Museum. Its date is about 600 B.C. A wedge of iron appears, however, to have been found between the stones of the Great Pyramid.

Herodotus mentions that when the Carians and Ionians landed in Egypt, in the seventh century B.C., they were armed with bronze weapons. An Egyptian went to apprise Psammetichus of the fact that brazen men had arisen from the sea and were wasting the country. It would appear from this that the Egyptians used iron at that period.

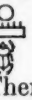
M. Devéria and M. Chabas both cite the discovery of an adze with an iron blade and a handle of bone or ivory. There is not much doubt that iron was rare in Egypt, in pre-Roman times.

There are two words known descriptive of iron, *ba en pe*, "heavenly metal," supposed to be meteoric iron; and *ba nu ta*, or "terrestrial metal," that found in the earth. They made use of hæmatite for various objects, such as beads, weights, figures, &c.

I shall now proceed to describe the implements I have already referred to as belonging mostly to my collection.

The first is a bronze axe of considerable interest, which was found at or near Beyrout, together with three others, all of different sizes; they in all probability came from a tomb, as there are traces of bitumen and cloth still adhering to one or more of them, indicating they were interred with a mummy. The largest axe is now in the collection of the Rev. Canon Greenwell, F.R.S.; it measures $5\frac{1}{2}$ inches in length, and $3\frac{1}{4}$ inches across the blade. It is a fine specimen of the Egyptian war axe (Plate VII, fig. 7); a socket runs through the upper part, and it was hafted into a wooden staff, as is seen by the remains of wood still existing in the socket. A stout rib runs down the centre at right angles to the handle; upon either side of this rib are holes, each placed obliquely to the rib; round the lower margin of each of these holes is a slightly raised rib, designed, we presume, for extra strength, or for ornament. Upon the oxidized surface of this axe the impression of cloth can be distinctly seen.

A second but smaller one is in the collection of General Pitt Rivers, F.R.S., but I have not the dimensions by me. A third one is in my own collection, which measures $3\frac{3}{4}$ inches in length, by $1\frac{7}{8}$ and $1\frac{1}{2}$ inches in width (Plate VII, fig. 10). It was hafted probably on a wooden handle, as was that belonging to Canon Greenwell. It has an elevated rib, at right angles to the socket, passing down the centre of the blade to its edge, which gives it greater strength; it has likewise two oviform holes, 1 inch in length, placed close up to the haft, upon either side of the rib. The fourth axe is much smaller in size, and is in the collection of Mr. T. W. U. Robinson, F.S.A., of Hardwick Hall, Durham.

Axe-heads were sometimes highly ornamented; for instance, there are two in the British Museum, one representing two bulls in the attitude of fighting, the figures being cut out of the bronze, and the other having a man on horseback. These axes were probably ceremonial, as they are too slender for use in war or otherwise. There is another of the same type of shape, bearing the prenomen of  Thothmes III., who ascended the throne about B.C. 1495. There is also in the British Museum a most interesting example of a war axe in bronze, of a long oval type, with two loops near the socket; its handle is of silver. This

example, though of much slighter make, is somewhat of the same type as that found near Beyrout, now in the collection of Canon Greenwell.

The next implement I shall describe is an adze or hoe of bronze, which was found last year at Tel Basta, together with two others, and was probably used by carpenters for cutting wood. Dr. Birch[1] says that "the adze answered in Egypt all the purposes of the modern plane, a tool which the Egyptians had not invented. Different kinds of adzes were employed, according to requirements, one being adopted for trimming wood, another by boat-builders, and a third by bow and arrow makers. Some of the adzes had wooden handles, and others iron blades."

This specimen must have been hafted into a wooden handle, which was fastened in by one strong rivet, the holes for which can be seen upon the specimen now exhibited. There is another theory for the use of this implement—that it was a hoe for tilling the ground. There is in the British Museum an iron hoe from North-Eastern Africa, with a long wooden handle, of much the same form as fig. 9; and implements of similar form, but without any socket, have been found in Peru and Ecuador, but these have probably been employed for splitting wood, as they bear marks of having been hammered. They are also in the British Museum.

The usual Egyptian hoe, however, as is well known, was made of wood, the blade and handle being simply bound together with pieces of twisted thong.

The blade of my specimen is $4\frac{1}{4}$ inches in length, and its height is close upon 3 inches (see Plate VII, fig. 9).

In Sir Gardner Wilkinson's "The Ancient Egyptians," Vol. I, p. 232, is a woodcut of leather-cutters at work, and one of them is using an implement of the same form as this, but my specimen is, I think, too large for that purpose. There are several hoes of this form in the British Museum; they were in all probability used with a long wooden handle similar to those before cited from North-Eastern Africa.

I shall next describe the head of a small javelin or spear, two-edged. The length of the blade is $1\frac{3}{4}$ inches, the length of the tang is $1\frac{1}{2}$ inches, and the total length of the javelin-head is $3\frac{5}{8}$ inches; it was probably hafted into a wooden shaft, and used for throwing (see Plate VII, fig. 6). I have another, $1\frac{3}{4}$ inches long, with a longer barb than the former; they are both made of bronze, and were found at Tel Basta.

These javelin-heads are much of the same form as those in the British Museum, and those figured by Sir Gardner

[1] See footnote, Wilkinson's "The Ancient Egyptians," vol. ii, p. 196, new edition, by Dr. Birch.

Wilkinson in his "The Ancient Egyptians," Vol. I, pp. 209 and 278, who says of them that "the javelin is lighter and shorter than the spear, was also of wood, and similarly armed with a strong two-edged metal blade, generally of an elongated diamond shape, either flat, or increasing in thickness at the centre, and sometimes tapering to a very long point, and the upper extremity of its shaft terminated in a bronze knob, surmounted by a ball, to which were attached two thongs or tassels, intended both as an ornament and a counterpoise to the weight of its point." There were several varieties in form of these javelins. Dr. Birch considers that weapons of this type were probably employed for hunting the crocodile.

The next in order to describe are the arrow-heads of bronze, which are of frequent occurrence in different parts of Egypt, and they vary very much in form. Similar types are also found throughout Asia Minor, Syria, and Greece, and it is difficult to say to what nation they really belong; possibly the types I now exhibit were in use by all the nations of the East at the time. Mr. Franks has stated that this Egyptian form of arrow-head has even been found as far east as China. It has been supposed by some that these arrow-points are not of higher antiquity than the Greek period.

It is most probable that the specimens found in various parts of Egypt are of Asiatic origin, probably Scythian. In "Archæologia Æleana," Vol. I, page 201, is an account of certain arrow-heads of bronze, found near Mount Caucasus, and communicated to the late Rev. J. D. Carlyle by His Excellency M. Tomara, Ambassador for Russia at Constantinople.

It appears from this that in 1817 the author, Mr. Carlyle, was informed by the Russian Ambassador that there had been discovered on the large plain at the foot of Mount Caucasus such immense quantities of arrow-heads, made of copper, that for some years fourteen furnaces were employed at that time in melting them down. Mr. Carlyle was presented with a collection of them, some of which are figured on a plate in the before-named paper. Many of them are of the same type as those found in Egypt.

The following arrow-heads are now exhibited from my own collection:—

1. Bronze arrow-head, three-bladed, cylindrical body for fixing into the shaft; length, $1\frac{3}{4}$ inches; from Elephantine. This specimen is in a fine state of preservation (Plate VII, fig. 1).
2. Two others of similar form from Tel Basta.
3. Four others, of shorter, with broader blades, from Tel Basta; length, $1\frac{1}{4}$ inches.

4. One of narrower form; length, 1½ inches; Tel Basta.
5. One similar form; length, 1¼ inches; Tel Basta.
6. One barbed form, deeply grooved between the blades; length, 1⅜ inches (Plate VII, fig. 3); Tel Basta.
7. Two triangular-shaped arrow-points, without cylindrical sockets (Plate VII, fig. 2); Tel Basta.
8. Another of similar form with cylindrical socket (Plate VII, fig. 4); Tel Basta.
9. Two-bladed arrow-head, with one barb on the cylindrical body. It is a remarkable fact that this form of arrow-head has frequently been met with in the Lake Dwellings of Switzerland (Plate VII, fig. 5).

Last December the British Museum acquired by purchase a most interesting mould, made of bronze, for casting such arrow-points, found near Mossul. It contains three compartments, and is formed to cast two three-bladed arrow-heads and one single-bladed arrow-head, with a barb on its shaft, of somewhat similar form to that I have already described as being found at Tel Basta.

Arrows complete, with the head affixed, whether they be of bronze, stone, or wood, are somewhat rare, and I have now to draw your attention to an interesting example of a reed arrow, which was found last year at Thebes, together with some others; but I only succeeded in acquiring this specimen. It measures 21 inches in length, is tipped with a flat bronze arrow-head, secured to the shaft by being bound on with a piece of thong, covered over with some black composition. The reed is notched at the end; the feathers, however, are wanting, but the position where the three feathers have been affixed is plainly visible. The reed is crushed in one part, and has been repaired by a piece of thong being bound round it.

The last object in bronze that I have to notice is the little razor of bronze (Plate VII, fig. 8). It is much in the form of a pair of scissors, and measures 2½ inches in length, and ¾ inch across the blade. There is a similar one in the British Museum, which was found in a leather case, together with razors of a different form, and which Dr. Birch considers formed the stock-in-trade of an itinerant barber.

The flint flakes and saws from Helwân which I now exhibit are of similar type to those described in this room by Mr. A. J. Jukes-Browne, F.G.S., on 11th December, 1877. Therefore I shall not say much about them, further than this: two appear to have been intended as lance-heads, and may well compare with those figured by Mr. Jukes-Browne ("Journ. Anthrop. Inst.," Vol. VII, Plate IX, No. 1,) except that mine is slightly shorter,

the length being 2½ inches. It is of a cherty sort of flint, and the edges on both sides are serrated.

Others are knife-shaped, some straight, and with edges chipped like a saw.

Description of Plate VII.

Fig. 1. Arrow-head, in bronze, socketted; from Elephantine.
„ 2. Ditto; from Tel Basta.
„ 3. Ditto, with three ribs; from Tel Basta.
„ 4. Ditto; Tel Basta.
„ 5. Ditto, with one wing or barb; from Tel Basta.
„ 6. Javelin-head in bronze; from Tel Basta.
„ 7. Axe-head, in bronze; from Beyrout.
„ 8. Razor, in bronze; from Thebes.
„ 9. Hoe, in bronze; from Tel Basta.
„ 10. Axe-head, in bronze; from Beyrout.

All the figures in this plate are drawn to one-half linear scale.

The following paper was then read by the author:—

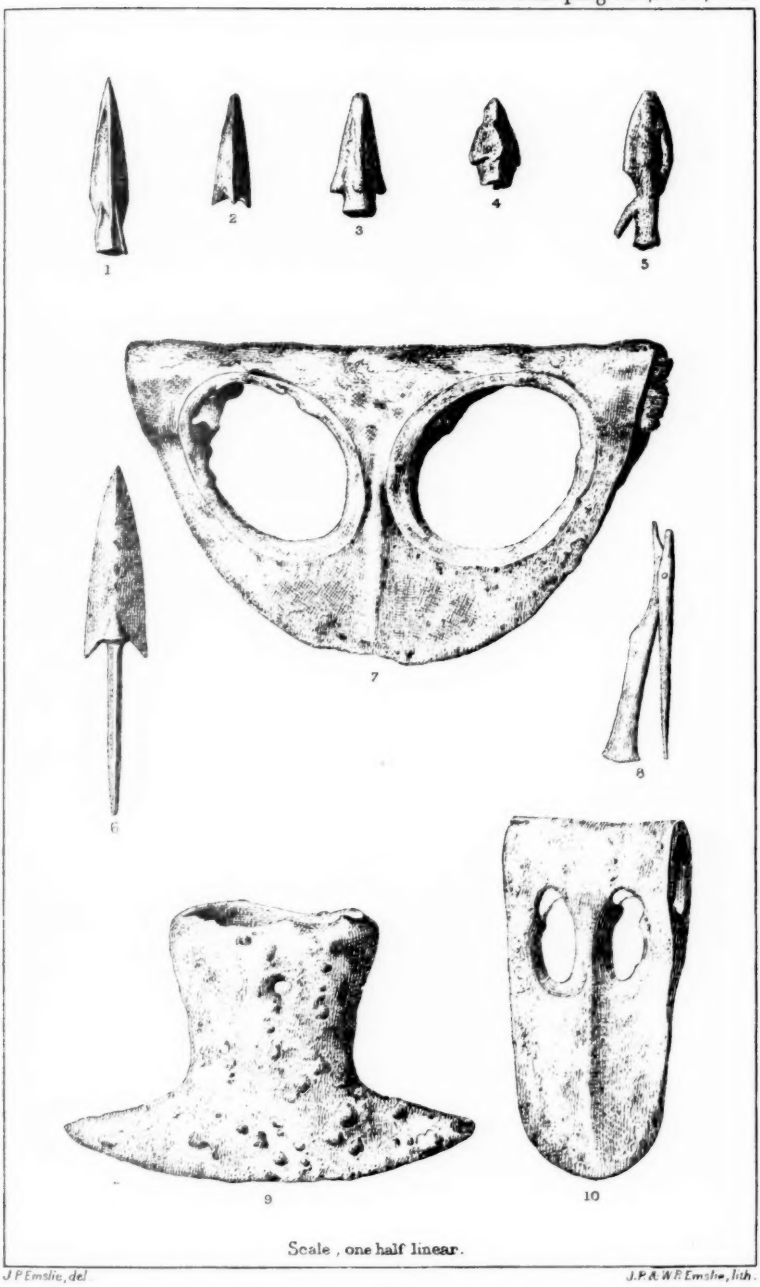
The FRANKFORT CRANIOMETRIC AGREEMENT, *with* CRITICAL REMARKS *thereon.* By J. G. GARSON, M.D., F.Z.S., Memb. Anthrop. Inst., Anat. Assist. Royal College of Surgeons, and Lecturer on Comparative Anatomy at Charing Cross Medical School.

[WITH PLATES VIII AND IX.]

FOR some time past anthropologists in Germany have been laudably endeavouring to come to a general agreement among themselves as to a method of measuring skulls which would be generally adopted. For this purpose a Craniometric Conference was held at Munich in 1877, and another in Berlin in 1880. The outcome of the deliberations of these conferences was a scheme drawn up by Professors Kollmann, Ranke, and Virchow, which was submitted for consideration to the 13th General Congress of the German Anthropological Society, held at Frankfort-on-Maine in 1882. The scheme was adopted and designated the "Frankfort Agreement," of which the following is a more or less literal translation.

The Horizontal Plane of the Skull.

The German horizontal plane, as accepted by the Craniometric Conferences held at Munich and Berlin, is defined as follows:—"That plane which is determined by two straight lines (one on



ANCIENT EGYPTIAN BRONZE IMPLEMENTS.

either side of the skull), connecting the lowest points on the inferior margins of the orbits with the points of the upper margins of the bony auditory meatus situated vertically above their centres" (Plate VIII, figs. 1 and 2, *hh*). In relation to this German horizontal plane is measured the direct length of the cranium, the height, the maximum breadth, the breadth of the forehead, and other cranial measurements; likewise the angle of inclination of the foramen magnum, the profile angle of the face, and several other facial measurements to be enumerated and described further on.

The Craniometric Conferences mentioned have also decided to accept a number of other measurements, which are independent of the horizontal plane of the skull, so that numerous and valuable older measurements which have not been made in relation to "our horizontal plane," and therefore not exactly comparable to it, be not rendered valueless; and secondly, for the important reason that in broken skulls in which the facial region is wanting, as is frequently the case among the most important prehistoric skulls, an exact determination of the German horizontal plane is impossible. In these cases it is decidedly preferable to select fixed anatomical points on the skull, as starting-points for the principal measurements, instead of making uncertain subjective estimates of the probable situation of the plane and of the measurements in relation to it. By the use of these points it is possible to make measurements taken without reference to the German horizontal plane accord with those made in reference to that plane.

The necessity for auxiliary measurements independent of the German horizontal plane, was expressly recognised by both Craniometric Conferences for determining the length of the skull. For measuring the height of the skull the same need is obvious; likewise an auxiliary measurement which, though placed at some distance from the base of the skull, is often indispensable to determine the breadth of the cranium.

The auxiliary measurements of length have already been determined upon by both Conferences. They are the maximum length, and that length "the anterior measuring point of which is situated in the middle of a straight line uniting the centres of the frontal eminences." This latter length-measurement seems to be indispensable for comparing the length of the skull proper of the Anthropoidea with that of man. Both lengths are measured with the callipers.

In the following list the names of the most important measurements of the skull are given, and short descriptions of the methods of ascertaining each. These will be rendered still clearer by the accompanying illustrations (Plates VIII, IX).

Linear Measurements of the Cranium.

1. *Horizontal length (gerade Länge).*—From the middle point between superciliary ridges on the glabella to the most prominent point of the back of the cranium (Plate VIII, figs. 1 and 2), measured parallel to the horizontal plane of the skull with the sliding compasses (*Schiebezirkel*). This measurement of length was agreed upon at the Craniological Conference at Berlin. In cases where the glabella is greatly developed it is desirable, when possible, to measure its thickness.

[To this measurement is appended a note pointing out the necessity of its being always made with the sliding compasses (*Schiebezirkel*), or with Spengel's craniometer, and not with the callipers; because in skulls in which the occiput is very prominent at its lower part, the posterior point on the skull of the horizontal length line will not be so far back as the point at which that line, if prolonged backwards, would intersect a tangent line drawn at right angles to the horizontal plane, and touching the most prominent point of the occiput, fig. 2. In such a case the horizontal length indicated is too short, and must be prolonged to the tangential line of the most prominent part of the occiput. This can only be done with the two first-mentioned instruments. However, even with these practice and repeated control are necessary. In skulls with full and rounded occiputs this is not a difficult measurement to make, since the most anterior and posterior points lie on the same level. Regarding the anterior point on the glabella, a mistake is unlikely to occur. The measuring instrument is always placed in the median line, and between the superciliary ridges when these are separated].

2. *The maximum length.*—From the centre between the arcûs superciliaries to the most prominent point on the back of the head, measured with the callipers without reference to the horizontal plane.

[To this a note is attached to the effect that it is only in skulls where the occiput is elongated posteriorly that a difference, which may be as much as 5 mm., occurs between this and the former length-measurement. When the occiput is full and rounded the horizontal and maximum lengths are identical, and when accurately measured the sliding compasses and callipers give the same results.]

3. *Intertuberal length.*—From the centre between the two frontal eminences to the most prominent point of the back of the head, without reference to the horizontal plane. Measured with the callipers.

Note.—The intertuberal length in brachycephalic skulls with

good rounded foreheads coincides very nearly with the maximum and horizontal lengths.

4. *Maximum breadth* (fig. 4, B—B).—Measured vertically to the median plane with the sliding compasses wherever it is only not on the mastoid processes or on the posterior temporal ridges. The points of measurement must lie on the same horizontal plane.

4*a*. *Auricular breadth of Virchow.*—The distance between the two upper borders of the auditory meatus.

5. *Minimum frontal breadth.*—The shortest distance between the frontal ridges near their base, measured with the sliding compasses or callipers (fig. 3, SS).

6. *Height.*—The so-called total height (*ganze Höhe*) of Virchow From the centre of the anterior border of the foramen magnum to the parietal curve, measured vertically to the horizontal plane with the callipers (fig. 1, H). The difference in height of the anterior and posterior borders of the *foramen magnum* will thereby be indicated, by which the Baer-Ecker height is determined.

7. *Auxiliary height.*—In broken skulls, as already stated, where the facial portion is wanting, the horizontal plane cannot be determined. As an auxiliary height which approaches very nearly to the total height, the height from the centre of the anterior border of the *foramen magnum* to the point at which the sagittal and coronal sutures meet (*Bregma* of Broca) should be measured with the callipers.

8. *Ear-height.*—From the upper border of the auditory meatus to the point of the vertex of the head situated perpendicularly above it, measured vertically in relation to the horizontal plane of the skull (fig. 2, OH). Sliding compasses.

9. *Auxiliary ear-height.*—From the same starting-point to the highest point of the parietal curve, about 2—3 cm. behind the coronal suture. Sliding compasses.

10. *Length of the base of the skull.*—From the middle of the anterior border of the foramen magnum to the middle of the naso-frontal suture. Callipers.

11. *Length of the basilar portion.*—To the spheno-occipital suture (starting-point as in No. 10).

12 and 13. *Greatest length and breadth of the foramen magnum.*—Measured in the median plane and transversely to it.

13*a*. *Breadth of the skull-base.*—Distance between the summits of the mastoid processes.

13*b*. *Breadth of the base of the skull.*—Distance between the most prominent points on the outer surfaces of the mastoid processes.

14. *Horizontal circumference of the skull.*—Measured with the

steel tape placed immediately above the superciliary ridges and over the most prominent point on the back of the head.

15. *Sagittal circumference of the skull.*—From the naso-frontal suture to the posterior border of the foramen magnum along the sagittal suture. Steel tape.

16. *Vertical transverse circumference of the skull.*—From the upper border of the one auditory meatus to that of the other, perpendicularly to the horizontal plane (2—3 cm. behind the coronal suture. Steel tape. (N.B.—Virchow till now measures No. 16 over the bregma.)

Measurements of the Face.

17. *Breadth of the face, of Virchow.*—Distance between the two jugo-maxillary sutures. The measurement must be made from the under and anterior point of the one suture to the corresponding point of the other.

17*a* and *b*. *Breadth of the face, of Von Hoelder.*—(*a*) Distance between the two inner angles of the malar bones. (*b*) The distance between two points situated vertically below the apices of the inner angles of the malars on their under borders.

18. *Bi-zygomatic breadth.*—Greatest distance of the zygomatic arches from one another (fig. 4, JB).

18*a*. *Interorbital breadth.*—Minimum distance between the inner borders of the entrance of the orbital cavities.

19. *Height of face* (fig. 2, GH).—From the middle of the fronto-nasal suture to the middle of the under border of the mandible.

20. *Upper* (= *middle*) *face-height.*—From the middle of the fronto-nasal suture to the middle of the alveolar border of the upper jaw, between the central incisor teeth (fig. 2, W—OK).

21. *Height of nose.*—From the middle of the fronto-nasal suture to the middle of the upper surface of the nasal spine, *i.e.* to the lowest border of the pyriform opening (fig. 2, W—NL).

22. *Maximum breadth of the nasal cavity.*—Wherever that may be measured horizontally (fig. 3, X).

23. *Maximum breadth of the entrance of the orbital cavity.*—From the centre of the median border of the orbital cavity to its lateral border, that is, the clear space between the two borders of the orbital cavity (fig. 3, *a*).

24. *Maximum horizontal breadth of the entrance of the orbital cavity of Virchow* (fig. 3, *c*).—Measured parallel to the horizontal plane, otherwise analogous to No. 23. It is very desirable to determine the angle which the lines Nos. 23 and 24 (fig. 3, *a* and *c*) make with one another.

25. *Maximum height of the orbital cavity.*—Measured verti-

cally to the greatest breadth between the upper and lower borders (fig. 3, *b*).

26. *Vertical height of the orbital cavity.*—Measured vertically to No. 24 (fig. 3, *d*), otherwise analogous to No. 25.

27. *Length of the palate.*—From the point of the palatal spine to the inner lamina of the alveolar border between the central incisor teeth.

28. *Middle palatal breadth.*—Measured between the inner alveolar walls opposite the second molar teeth.

29. *Posterior palatal breadth.*—Measured at the posterior ends of the palate—*i.e.*, between their inner alveolar borders.

30. *Length of the profile of the face* (Kollmann's *facial length*) (fig. 2, GL).—Measured from the most prominent point of the centre of the outer alveolar border of the upper jaw to the anterior border of the foramen magnum (in the median plane).

31. *Profile angle.*—That angle which the profile line makes with the horizontal (fig. 1, $< hPf$). The measurement of other angles of the face and cranium remains still to be determined.

Measurement of the Capacity of the Skull.

32. The capacity of the skull is measured with shot (in fragile skulls with millet seed). The method to be followed remains for future consideration.

Skull Indices.

Length and Breadth Index.

$$\frac{100 \times \text{breadth}}{\text{length}}.$$

Dolichocephalic (long skull)	below 75·0
Mesocephalic	75·1 to 79·9
Brachycephalic (short skull) ..	80·0 „ 85·0
Hyperbrachycephalic	85·1 and over.

Length and Height Index.

$$\frac{100 \times \text{height}}{\text{length}}.$$

Chamæcephalic (flat skull) ..	75·0 and under.
Orthocephalic	70·1 to 75·0
Hypsicephalic (high skull) ..	75·1 and over.

Profile Angle.

The inclination of the profile line to the horizontal plane is classified under the three following divisions:—

1. Prognathous .. .. 82° and under.
2. Mesognathous or orthognathous 83° to 90°
3. Hyperorthognathous .. 91° and over.

Facial Index (Virchow).

$$\frac{100 \times \text{height}}{\text{length}}.$$

The breadth of the face considered as the linear distance between the two jugo-maxillary sutures. The facial height No. 19. (So also the facial index of Von Hölder).

Broad-faced skull .. .. 90·0 and under.
Narrow-faced skull .. .. 90·1 and over.

Index of the Upper Face (Virchow).

$$\frac{100 \times \text{upper facial height}}{\text{facial breadth}}.$$

Facial breadth considered as the linear distance between the two jugo-maxillary sutures, and the upper facial height (No 20) as above.

Broad upper face index .. 50·0 and under.
Narrow upper face index .. 50·1 and over.

Zygomatic Facial Index (Kollmann).

$$\frac{100 \times \text{facial height}}{\text{zygomatic breadth}}.$$

The greatest distance between the zygomatic arches (No. 18) and the facial height (No. 19). Divided into two classes—

Low-faced, chamæprosopic[1] skull .. 90·0 and under.
High-faced, leptoprosopic skull .. 90·1 and over.

Zygomatic Upper Facial Index (Kollmann).

$$\frac{100 \times \text{upper facial breadth}}{\text{zygomatic breadth}}.$$

Chamæprosopic upper face with an index of 50·0 and under.
Leptoprosopic upper face with an index of .. 50·1 and over.

[1] προσωπον, the face.

The upper facial index acts as a control measurement to the facial index. It is important to ascertain it in cases where, through absence of the lower jaw, the facial index cannot be determined.

Orbital Index.

$$\frac{100 \times \text{orbital height}}{\text{orbital breadth}}.$$

Chamækonchous	80·0 and under.
Mesokonchous	80·1 to 85·0
Hypsikonchous	85·1 and over.

Nasal Index.

$$\frac{100 \times \text{nasal breadth}}{\text{nasal height}}.$$

Leptorhine	47·0 and under.
Mesorhine..	47·1 to 51·0
Platyrhine	51·1 „ 58·0
Hyperplatyrhine	58·1 and over.

Palatal Index (Virchow).*

$$\frac{100 \times \text{palatal breadth}}{\text{palatal length}}.$$

Leptostaphyline	80·0 and under.
Mesostaphyline	80·1 to 85·0
Brachystaphyline..	85·1 and over.

The divisions of the indices marked * are provisional; their ultimate determination remains for future consideration.

The following table of the most important measurements and indices of the skull is then added.

Principal Measurements and Indices of the Skull.

CRANIAL PORTION.

No. of Skull.	Origin, Sex, Age.	Capacity.	Length.	Breadth.	Frontal Breadth.	Height.	Ear-Height.	Length of the Base of the Skull.	Horizontal Circumference.	Sagittal Circumference.	Transverse Vertical Circumference.
...	...	Cap.	L.	B.	B^1.	H.	E.H.	L.B.	H.C.	S.C.	T.C.

FACIAL PORTION.

Facial Height.	Upper Facial Height.	Facial Breadth.	Zygomatic Breadth.	Nasal.		Orbital.		Palatal.		Profile Angle.
				Height.	Breadth.	Breadth.	Height.	Length.	Breadth.	
F.H.	F^1.H.	F.B.	Z.	N.H.	N.B.	O_1.	O_2.	P_1.	P_2.	P>.

INDEX.

Length-Breadth.	Length-Height.	Breadth-Height.	Facial.	Upper Facial.	Nasal.	Orbital.	Palatal.	Remarks.
L.B.	L.H.	B.H.	F.H., F.B.	F^1.H, F.B.	N.H., N.B.	$O_1.O_2$.	P^1. P_2.	

Sixty-seven signatures of adherence are appended to the Agreement, among which are the names of several well-known anthropologists of Germany. Two signatures, those of Professors Aeby and Schaaffhausen, have riders attached to them. Professor Aeby adds that though he has signed the convention he nevertheless adheres to the fundamental principles expressed in his former works. Professor Schaaffhausen adheres to the Agreement on condition that an improper value be not set on the natural horizontal of the skull, which he has hitherto fixed as a line passing forwards through the centre of the auditory meatus, and cutting the profile line at a fixed point. For uniformity he is willing to take this line from the upper border of the meatus.

Before criticising the so-called German horizontal plane I must remark that it has hitherto been customary to consider those devoting themselves to any branch of science as belonging to one brotherhood, totally irrespective of the country to which they happen to belong, and beyond all national prejudices, with one common aim, namely, that of advancing the department to which they are giving their attention. That anthropologists in Germany should introduce the use of such terms as "German" and "our" to craniometrical questions is much to be regretted, as tending to destroy that feeling of unity which has always existed among scientific men. Nor are the terms alluded to the only exception that can be taken to the Frankfort Agreement. It seems to have been drawn up with little consideration of what has been done by other anthropologists over the world, save that of a few in Germany. Important measurements, which yield marked results in comparing skulls of different races, are entirely ignored, and methods of measuring accepted by anthropologists generally are altered without any reason being given for the change. The accuracy of these observations I now make will be apparent to any one acquainted with the literature of physical anthropology and the systems usually employed.

In drawing up any code of craniometrical measurements the extensive researches of Broca must be taken as the basis, this being the system which has been adopted by anthropologists generally over the whole world.

The horizontal plane adopted by the Frankfort Agreement is one which, in a slightly different form, has been before anthropologists for some time, having been originally proposed by the Russian craniologist, Von Baer, who placed the horizontal plane of the skull along the line of the zygomatic arches. Von Ihering modified, or rather defined, this plane more precisely as a line drawn from the centre of each auditory meatus to the lowest

point on the inferior margin of each orbit. By the Frankfort Agreement the plane has been further modified by making the horizontal lines pass from the upper borders of the meatus to the lowest borders of the orbits. In none of its modifications has it been accepted by any except some German anthropologists, and not by all of them even yet. The question, which plane is the skull to be placed in for purposes of drawing and comparing drawings? has been for a long time much disputed, and various positions have been proposed; for a history of the subject I must refer those interested to the researches of Von Ihering,[1] Broca,[2] and Schmidt,[3] as it is too long to enter on here. The horizontal position most generally adopted by anthropologists is the condylo-alveolar plane, which has been shown by Broca to approach nearer than any other to that of the axis of vision when this is horizontally directed. A cranium can very easily be placed with the condylo-alveolar plane horizontal by means of Broca's craniostat or Topinard's very simple craniophore. Photographs or drawings of skulls in this position are very readily and accurately compared. Von Ihering,[4] Schmidt,[5] and Spengel[6] in their respective papers, have advocated the superiority of the audito-orbital plane. My own independent observations show me that in some instances this plane is directed more or less obliquely downwards instead of being horizontal; the same objection has been found to that of Von Baer by Broca. A decided objection to the adoption of the Frankfort plane in preference to the condylo-alveolar, even granting that the merits of the two are equal, is that it is more difficult to place the skull in the former than in the latter plane, and a more complicated apparatus is required. Above all things in anthropological research, simple and accurate instruments, easy of application, are desiderate objects, which, I regret to say, Germans do not always keep in view. As seen in a diagram, the audito-orbital, or so-called "German" horizontal plane, is a very precise and excellent one, but this may be said for several others which have been proposed at various times. The apparatus in which the skull has to be suspended, in order to place it in this plane (a frame such as that figured by Schmidt[7]), is a considerable obstacle in making a geometrical diagram of it with Broca's *stereograph*, or the *diagraph* of Garard, which are perhaps the

[1] "Arch. f. Anthrop.," Bd. v (1872).
[2] "Bull. Soc. d'Anthrop." (Paris, 1873).
[3] "Arch. f. Anthrop.," Bd. ix (1876).
[4] *Loc. cit.*
[5] *Loc. cit.*
[6] "Zeit. f. Ethnol.," Bd. ix (1877).
[7] "Arch. f. Anthrop.," Bd. ix, p. 34 (1876).

most effective and simplest instruments for obtaining exact geometrical tracings. It is true that the skull could be placed loosely on the craniostat, adjusted to the audito-orbital plane with the frame, then fixed on the craniostat by means of its screw, and finally the frame removed. Such a procedure would, however, be difficult, owing to the care necessary in adjusting the skull, as well as in keeping it in exact position during the process, and consequently errors would frequently occur.

An object to which great importance is evidently attached in the Agreement is that several measurements of the skull shall be taken in relation to the horizontal plane. This idea is not a new one, having been advocated by Spengel[1] and by Schmidt,[2] but it has not been taken up by anthropologists generally. With all due deference and respect to the opinion of our brethren in Germany, and the anthropologists of world-wide repute who have signed the Agreement, I venture to say that the advantages of having such measurements are chiefly theoretical. They are only obtainable with any degree of accuracy by means of complicated and costly apparatus, suitable only for the laboratory, and not even then, by their own showing, except after repeated control-measurements. The form of the skull is quite as fully and accurately indicated by means of measurements from certain fixed anatomical points with a simple pair of sliding callipers, such as those excellent ones of Professor Flower, which combine all the advantages of the *compas glissière* and the *compas d'epaisseur* of Broca, as by those measurements made in relation to the horizontal plane. The very great advantage of the former measurements is that they can be easily and accurately made without the manipulative skill and practice necessary for making the latter with corresponding accuracy.

From what I have just stated, it naturally follows that I do not attach importance to the horizontal length (*gerade Länge*) of the skull, as I believe the maximum length expresses fully the length of the skull. The fact that the horizontal and maximum lengths are the same excepting unusually formed skulls is sufficient reason, I think, to render a third column of length, in tables of skull measurements, superfluous. As regards the maximum length, it will be observed that it is not stated whether this is measured in the median line, as is directed to be done by Broca, and which should always be followed. The intertuberal length, as defined, is extremely indefinite, but I presume it is that of Welcher, the great objection to which is that its anterior measuring point is very indefinite. The length of the cranium,

[1] *Loc. cit.*
[2] *Loc. cit.*

excluding the glabella, can be much more accurately measured from the ophryon to the most prominent part of the occiput—the ophryo-occipital length of Flower and others.

The auricular breadth of Virchow likewise wants definition, the upper border of the auditory meatus being on a rapidly sloping plane. If the points of measurement are situated where the auriculo-bregmatic lines cross the prolongation ridges backwards of the zygomatic arches, the measurement is a very good one, being what we know in England as the bi-auricular breadth, which differs from that of Broca by including instead of being *above* the zygomatic ridges.

The height (No. 6), as recommended to be taken, is an unsatisfactory measurement. The auxiliary height (No. 7), taken from the basion to the bregma, is the height-measurement adopted now by the great majority of anthropologists, and is one of the most certain measurements of the skull, on account of the precision of those two points. The ear-height and auxiliary ear-height must also be classed as unsatisfactory, since all measurements which require to be made indirectly, that is, by measuring to a point off the skull, but corresponding to a point on it, are very uncertain, being difficult to measure and as frequently inaccurate as they are correct.

The length of the basilar portion of the cranium (No. 11) recommended can only be measured accurately in skulls when the basilar suture is still open. It is, however, a rule in craniology to reject all skulls in which the basilar suture is open; yet we have here a measurement proposed from the basion to that suture which closes about the twenty-fifth year, and in the majority of skulls is so obliterated by about the thirtieth year as not to be discernible with accuracy. The best measurement of this portion of the cranium is undoubtedly that proposed by Broca, from the basion to the posterior edge of the vomer.[1]

The breadth of the base of the skull at the base and summits of the mastoid process (Nos. 13*a* and 136*b*) have ceased to be taken by several anthropologists, as not being satisfactory measurements, and in my opinion should not find a place in a list of only the more important cranial measurements.

The vertical transverse circumference (No. 16) is in reality only an arc, not being continued across the base of the cranium, and differs from that designated the supra-auricular or bregmatic arc (which passes from one auditory point over the bregma to the other) in being taken perpendicularly to the horizontal plane, and consequently is not so good a measurement as the bregmatic arc. It will be observed that unanimity does not exist even among the framers of the scheme as to this measure-

[1] "Revue d'Anthrop.," 2nd ser., vol. v, p. 584.

ment, since in a note it is stated that "till now Virchow measures over the bregma." It is to be hoped that he will prevail on his colleagues to adopt his method.

As the other measurements of the cranium defined in the Agreement, viz., the maximum breadth, minimum frontal breadth, basio-nasal length, length and breadth of the foramen magnum, and the horizontal circumference, are exactly the same as those of Broca used generally by anthropologists, I need not allude to them.

We now come to consider the facial measurements; the first of these is the facial breadth of Virchow (No. 17), which is known in Broca's list of craniometrical measurements as the maximum bi-maxillary breadth, a name indicating its real character much better than that of facial breadth. It is a very precise and excellent measurement, and I almost think might replace Broca's bi-malar breadth, which, though it yields good results in distinguishing races, is very difficult to measure, and uncertain.

Under the facial breadth of Von Hoelder two measurement are included, viz.: the bi-jugal breadth and a similar measurement on the under-surface of the jugal bone, which is more uncertain, and, as far as I can see, superfluous. The first measurements (No. 17*a*) should be retained under the name of bi-jugal breadth, by which it is universally known.

The height of the face and of its upper or middle portion (Nos. 19 and 20).—The total height of the face, as here defined, from the basion to the under border of the mandible, can rarely be ascertained, owing unfortunately to the mandible or the teeth being frequently absent. The height of the middle portion is more practicable, and is a very useful measurement, giving not only the height of the face from the alveolar point to the nasion, but also completing the facial triangle when taken in conjunction with the basio-nasial and alveolar lengths. I am bound to admit that the facial height of Broca, which is the distance from the alveolar point to the ophryon, is an unsatisfactory measurement, owing to the ophryon not being a definite enough point; though on theoretical grounds it may be a good measurement, the portion of the skull between the nasion and the ophryon being more a portion of the face than of the brain-case proper. In matters where precision are concerned, I think theoretical reasons must yield to practical, and on this ground I for one would be happy to accept the nasio-alveolar height as the height of the face. The measurement, including the mandible, I think, we must consider impracticable, though it might be measured whenever possible. Of the measurements of the orbit I regard the horizontal width and vertical height (Nos. 24 and 26) as uncertain and

unnecessary: uncertain, because they cannot be taken with sufficient accuracy, or only from a geometrical projection of the skull on paper, and unnecessary since the maximum width and height give the information required. I am quite aware that it is desirable to estimate the angles at which the transverse axes of the eyes make with the median line, but I believe this could be more accurately measured by direct means than by measuring the angles of incidence of the horizontal and maximum width lines.

The length and breadth of the palate are somewhat similar to those recommended by Broca, but cannot be considered satisfactory, firstly because it is very seldom that the palatal spine is perfect, and secondly because the spine does not represent the true length of the palate, being a bony prolongation beyond its posterior border. Some years ago Professor Flower[1] proposed a method which I believe to be preferable to that of Broca's, viz.: the length of the palate, from the alveolar point to the line of the posterior tuberosities of the maxillæ, measured in the mesial line; the breadth, that between the external lamellæ of the maxillary bones opposite the second molar tooth. These measurements, which can be ascertained with ease and precision, he has termed the maxillary length and breadth. The posterior palatal breadth does not seem to me to be of such importance as to warrant its insertion in such a table of measurements as that under review.

The length of profile of the face of Kollmann (No. 30) is the same as the basio-aveolar length of Flower,[2] and is a most valuable measurement. The name applied to it is, however, inferior to that of "basio-alveolar length," which is much more expressive. The profile angle (No. 31) is extremely ill-defined, but from the diagram appended (fig. 1, P*f*) I conclude it is the profile angle of Von Ihering,[3] which is the angle which a line passing from the nasion to the alveolar point makes with the horizontal line. Such an angle cannot be directly and accurately measured on the skull, but only on a drawing or diagram; consequently it is very objectionable, and should not be adopted. This angle, moreover, does not represent the true profile of the face if the previous measurement, No. 30, is considered, as it has been, the length of profile. The profile angle would logically be the angle at the alveolar point which the basio-alveolar line (No. 30) makes with the profile line, and which is undoubtedly the true profile angle.

The method of indicating prognathism or orthognathism

[1] "Journ. Anthrop. Inst.," vol. x, p. 161 (1880).
[2] "Proc. of the Royal Inst. of Great Britain," 1878.
[3] "Arch. f. Anthrop.," Bd. v (1872).

which to my mind is the simplest, and at the same time very effective, is that of Professor Flower.[1] It consists of forming an index from the basio-nasial and basio-alveolar measurements, the former being taken as 100; the formula is therefore $\frac{100 \times \text{basio-alveolar length}}{\text{basio-nasial length}}$. When the index is below 100, as in most Europeans, the face is straight or orthognathous, but when over that number, as in most negroes, it is more or less prognathous. This index has been divided by Flower into three classes:—

Orthognathous	below 98·0
Mesognathous	98·1 to 103·0
Prognathous..	above 103·0

The other measurements, namely, the bi-zygomatic and inter-orbital breadths, the length and breadth of the nose and of the orbit (Nos. 23 and 25), are the same as those defined by Broca in the "Instructions Craniologique," and usually adopted by anthropologists.

We have finally to examine the indices of the chief dimensions of the skull, and the classification proposed for them. The length-breadth, or cephalic index, is not properly defined, the length-measurement to be used in estimating it not being stated. The limits of the divisions into dolicho-, mesati-, and brachycephalic correspond exactly to those of Professor Flower,[2] but there is an additional group, the hyperbrachycephalic. The height index closely corresponds to Broca's divisions. The length measurement used in calculating this index is likewise not stated. The facial indices of Virchow are no indications of the facial breadth to its length, since the facial breadth used in the calculation of the indices is the superior bi-maxillary width, whereas the true breadth of the face is the bi-zygomatic width which has been adopted by Kollmann. The facial indices of Virchow might, it appears to me, be omitted from the list, and those of Kollmann, which are good indices, be retained. The orbital index differs from that of Broca and Flower in each of its three divisions, being two units lower than in the classification of these anthropologists. The nasal index is also one to two units lower than theirs, and has an additional division, that of hyperplatyrhine. The palatal index differs considerably, being no less than nearly ten units higher in the Frankfort classification than in Broca's, but it is stated the classification of this index is not definitely settled yet, as well as those of the length and breadth of the face.

[1] Osteological Catalogue of the Museum of the Royal College of Surgeons (1879), Part I, p. 251; and "Journ. Anthrop. Inst.," 120 (1879).

[2] *Loc. cit.*

In connection with the nomenclature of the different indices, certain distinctive and technical terms have been introduced in addition to those already in use, which will prove useful in describing the form of different parts of the face especially. Why similar terms invented by Broca, and now universally applied to certain points from which measurements are made—such, for example, as "basion," "ophryon," and several others—are entirely discarded for roundabout descriptions and definitions of the points, is not easy to understand, as by their use clearer ideas are conveyed as to points of measurement. It is also to be regretted that anthropologists in Germany have separated themselves from those in the rest of the world, by not adopting the same limits in the classification of indices derived from measurements universally used, such as those of the orbit and nose, the result of which will only be to cause confusion and detract from the value of certain convenient terms. We trust that when the limits of those indices, which are not yet definitely fixed, are finally arranged, due regard will be paid to the classification of those adopted by other anthropologists as well as those in Germany.

CONCLUSION.

After a careful study of the Frankfort Code of Measurements I think that it will be generally felt by anthropologists that while in some respects it is a step towards the unification of the methods of research in physical anthropology, which will be hailed with satisfaction, yet in others it is extremely unsatisfactory. It is satisfactory that the importance of the following measurements (numbered the same as in the text of the Agreement) has been recognised, and the method of making them is now agreed upon generally:—

2. Maximum length.
4. Maximum breadth.
5. Minimum frontal breadth.
7. Height (basio-bregmatic).
10. Basio-nasial length.
12. Length[1] } of foramen
13. Breadth } magnum.
14. Horizontal circumference.
15. Fronto-occipital arc.
17*a*. Bi-jugal breadth.
18. Bi-zygomatic breadth.
18*a*. Inter-orbital breadth.
21. Height of nose.
22. Breadth of nose.
23. Orbital breadth.
25. Orbital height.
30. Basio-alveolar length.

[1] This measurement should certainly be added in the short table of "Principal Measurements," as without it the total sagittal circumference of the brain-case cannot be estimated.

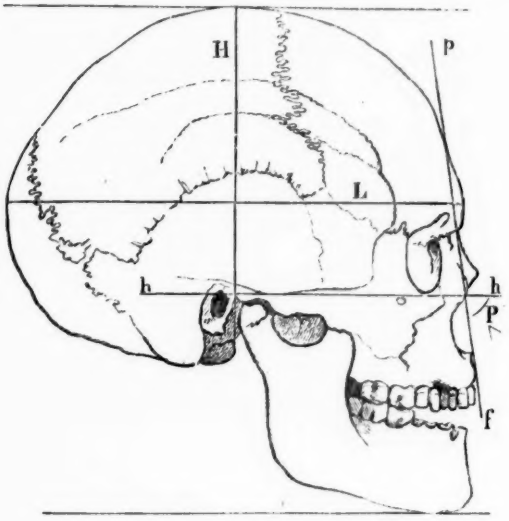


FIG. 1.

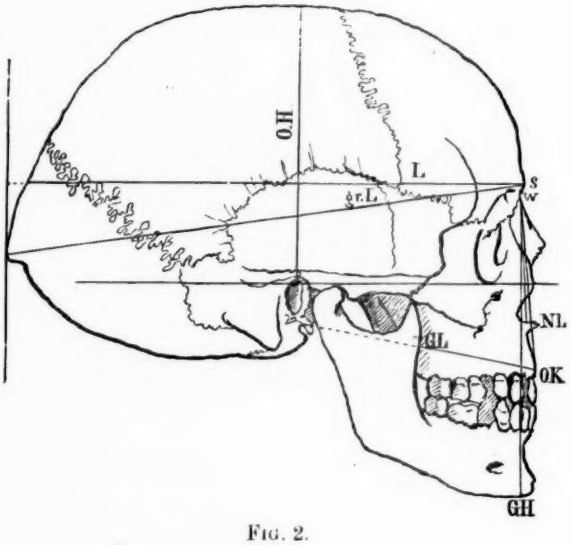


FIG. 2.

DIAGRAMS ILLUSTRATING CRANIAL MEASUREMENTS.

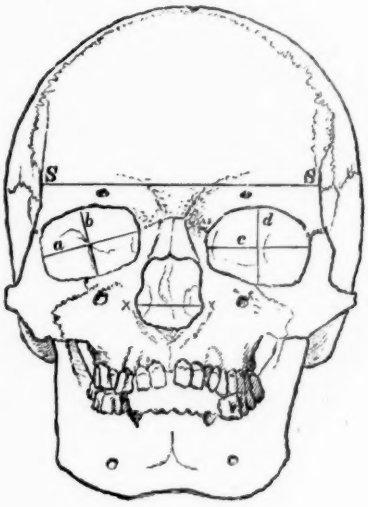


FIG. 3.

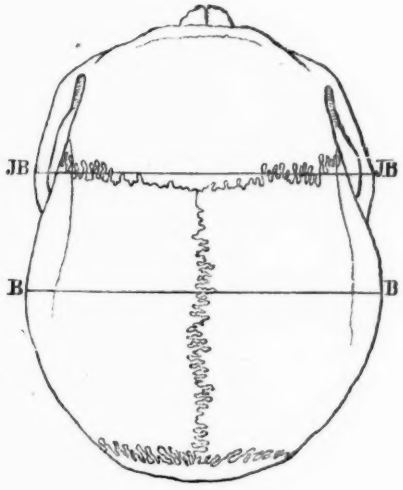


FIG. 4.

DIAGRAMS ILLUSTRATING CRANIAL MEASUREMENTS.

The unsatisfactory portion of the Agreement is, that we must refuse to accept the following measurements proposed in it:—

1.	Horizontal length.	17*b*.	Infrajugal facial breadth.
6.	Total height.	24.	Maximum horizontal orbital breadth.
8.	Ear-height.		
9.	Auxiliary ear-height.	26.	Vertical height of orbits.
11.	Basilar length.	27.	Palatal length.
13*a*.	Bi-mastoid width.	28.	Palatal breadth.
13*b*.	Breadth of base of skull.	29.	Posterior palatine breadth.
16.	Transverse vertical arc.	31.	Profile angle.

Some of these are not accepted, owing to the points on the skull between which they are made not being satisfactory, and there is reason to hope that an understanding might be come to regarding them. The case is not so hopeful regarding others, which would appear from the text to involve the fundamental principles of the whole "Agreement"—I refer to the system of measuring the skull in relation to the Frankfort horizontal plane, to which we cannot assent, and which we would fain hope to see abandoned by our brethren in Germany for the more practical method adopted by the majority of anthropologists elsewhere.

Description of Plates VIII and IX.

Four Diagrams illustrating some of the cranial measurements recommended by the Frankfort Conference. Reproduced from the "Archiv für Anthropologie" by the courtesy of the German Anthropological Society, through Professor J. Ranke, of Munich.

Discussion.

Professor Struthers, of Aberdeen, expressed his concurrence with the views of Dr. Garson. As one who had been long engaged in anatomical teaching, he felt the new interest which had been given to the study of the anatomy of these parts by regarding them from the anthropological point of view, as well as the interest which had been given to anthropology by importing into it anatomical considerations. He went on to say that it seemed to him that much might be done to explain the forms of skulls by considering the functions of their several parts, especially the influence exerted by the muscles of the jaw, and suggested this as an inquiry worthy of the attention of some of the younger anatomists who had time to pursue it.

Professor Thane observed that the meeting was greatly indebted to Dr. Garson for the trouble he had taken in bringing this code before the Institute, for the full and clear account he had given of it, and for the criticism to which he had subjected it. With the

main features of that criticism the speaker entirely agreed. The names of those by whom the code had been prepared, and the list of those by whom the system had already been accepted, including most, if not all, of the eminent anatomists in Germany, who were working with so much zest and success in this branch of anthropology, must claim for it a most respectful consideration; and, moreover, it must be remembered that we had not before us a complete series of craniometrical instructions adapted for the guidance of beginners or of foreigners who could not be expected to be acquainted with the numerous and prolonged discussions of which the code is the outcome, and therefore the impressions which the study of the code alone had made upon us might be subject to modification in the light of further information. Additional information was especially to be desired as to the precise method of taking some of the measurements and the instruments which were employed, as to the objects of others, and as to the grounds upon which the selection of many of them was based. The principle upon which the chief dimensions of the cranium and the degree of projection of the facial portion of the skull were estimated was, however, obvious. An attempt was made to ascertain the horizontal and vertical extent of the skull while in its natural position, as it was carried during life. To this proceeding there were many objections, both to the principle itself and to the method of carrying it into practice. Whichever of the many that had been suggested be selected as the horizontal plane of the skull, the position must be an artificial one, for it was well known that all these planes varied more or less in different individuals in their relation to the true horizontal of the head, the visual axis. In this system the principal length of the cranium was in some cases not a direct measurement of the skull at all, but only a statement of its antero-posterior projection in a conventional position. To calculate indices from this dimension was misleading, since the relation of the height and breadth to the actual length of the skull was not thereby indicated; and at the same time it became extremely difficult, if not impossible, to compare results obtained from the measurement of skulls with observations on living persons. The remarks in the code itself, as to the close agreement between the vertical height and the basio-bregmatic height were a strong argument for preferring the latter, which was taken easily and directly between well-defined anatomical points, to a measurement that could only be taken indirectly, with difficulty, and with considerable liability to error. The system, in fact, strove after a mathematical accuracy which was unattainable in dealing with objects that showed so much individual variation, and in the effort to obtain this a violence was done to nature that, in the speaker's opinion, far outweighed the theroetical advantages of the plan. With regard to the horizontal that had been chosen, the "German horizontal plane," apart from the circumstance that the skull when placed as directed was in many cases obviously not in its natural position, laboured under

the disadvantage that the tranverse lines joining respectively the highest points of the ear-openings and the lower margins of the orbital apertures were frequently enough not parallel, so that the so-called horizontal lines necessarily differed on the two sides of the head, and could not be brought into one plane. The individual measurements had been so fully discussed by Dr. Garson that further remarks upon them would be superfluous, and Professor Thane only expressed his feeling that it was greatly to be regretted that the French system, that was now meeting with such wide acceptance in other countries than Germany, appeared to be entirely ignored, and that even the convenient terms introduced by Broca for the various important craniometrical points and regions were not made use of.

The PRESIDENT also took part in the discussion, and the AUTHOR replied.

On some PALÆOLITHIC FISHING IMPLEMENTS *from the* STOKE NEWINGTON *and* CLAPTON GRAVELS. By JOHN T. YOUNG, F.G.S.

(*Abstract of a Paper read before the Anthropological Institute, February* 12*th*, 1884.)

MR. YOUNG said that it had occurred to him that in view of the large number of implements obtained from these gravels, a careful and systematic examination ought to bring to light a number of the smaller and less obvious tools which, when found and identified, might be useful, not only in illustrating the habits of the men who made them, but also as a guide in the examination of other and similar deposits when, as is often the case, the larger and better known implements are not readily discovered. Acting on this principle Mr. Young had discovered and exhibited to the meeting the following amongst other forms:—

1. A number of flint hooks varying in size from ¾ inch to more than 4 inches in length, and in weight from a few grains to over ¾ lb.; some of these had a shank to which a line might be attached without difficulty, but in other cases the top of the shank was either worked flat or trimmed to a blunt point, presumably for insertion into bone or wood.

2. A series similar in form to each other, but differing much in size, which he thought were probably used as armatures for wooden hooks, such as are described in Ellis's "Polynesian Researches." The Polynesian hooks were sometimes as much as 12 or 15 inches long, exclusive of the armatures, and of every form and size.

Two specimens of modern hooks with bone points were also exhibited in illustration of the author's views—one a North American halibut hook, and the other Polynesian for use without bait.

3. A series of double-pointed implements, some straight and others curved, and varying in sizes, which Mr. Young thought were fish gorges—implements which had been used in all parts of the world and in all ages.

4. A number of celtiform implements or weapons, varying from $\frac{1}{8}$ inch in length by every gradation to the ordinary sizes of celts. These he classified provisionally, according to size, as spear-, javelin-, and arrow-heads.

ANTHROPOLOGICAL MISCELLANEA.

On Artificial Deformation *of the* Head *in* Sumatra, Celebes, *and the* Philippine Islands. By A. B. Meyer, M.D., Director of the Royal Ethnological Museum, Dresden; Corr. Memb. Anthrop. Institute.

In No. IV, Vol. XIII, of the "Journal of the Anthropological Institute of Great Britain and Ireland" (May, 1884, p. 402), Mr. H. O. Forbes, referring to a paper of mine in *Nature* for December 8th, 1881, says: "Cases were recorded from Sarawak and Celebes which evidently were instances of undoubted intentional deformity; *the others, from Celebes, Philippine Islands, Sumatra,* Timor, and Timor-laut, had no authentic history beyond what was deduced from an examination of the specimens." Mr. Forbes doubts, therefore, the intentional deformation in the cases printed above in italics, and appears never to have heard of the custom in Sumatra, also quoting Marsden, who says: "The children are nursed but little, and are not confined by any swathing or bandage."

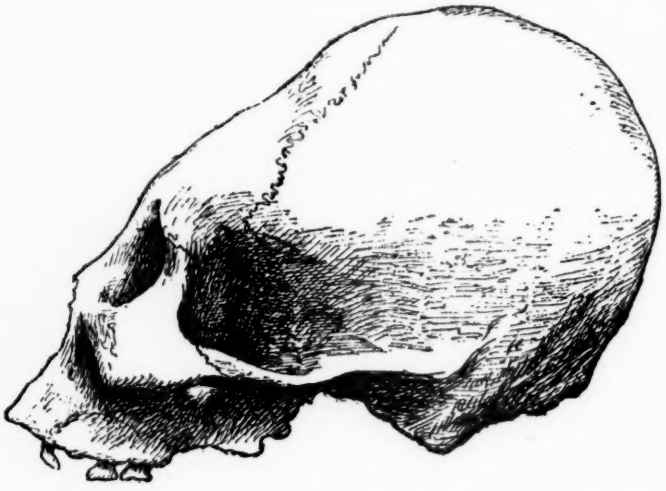
It was certainly never my opinion that in *all* the cases quoted by myself the deformation was intentional, as can easily be seen by reference to my original paper, "Uber künstlich deformirte Schädel," &c. (Leipzig, 1881), of which the notes in "Nature" were only a short abstract; but, on the other hand, it is there shown that the statement of Mr. Forbes, as to Sumatra, Celebes, and the Philippine Islands, is erroneous.

The same Marsden, quoted by Mr. Forbes, also wrote ("History of Sumatra," 3rd edition, 1811, p. 44): "The women have the custom of compressing the heads of children newly born, whilst the skull is cartilaginous, which increases their natural tendency to that shape;" and other references are given as to Sumatra on page 13 of my paper.

With regard to Celebes, here too Mr. Riedel, one of our best authorities on this island, if not the best, said ("Zeitschrift für Ethnologie," VII, Verh. 11, 1875) that the custom is in use with the Bugis, and these are scattered all over the island. The same author has seen the custom in practice with the inhabitants of Buol, Kaidipan, and Bolang-itam, in North Celebes, which is the only case Mr. Forbes appears to recognise as convincing. But, besides, Mr. Wilken, another authority on Celebes, observed the custom at

Passan and Ratahan in the Minahassa (see "Tijdschr. v. Ind. Taal, Land en Volkenkunde," Vol. XXI, 374, 1874); the process of deforming here going on during fifty to sixty days. Further, Mr. Riedel states the same for Central Celebes with the Toragi, Tondai, Toran, and Tomori tribes (see "Zeitschrift für Ethnologie," VI, Verh., p. 215, 1874, with figures), and describes the process in detail; finally, the same author does so for the Bautiks in the Minahassa and in Mongondu, and for the other inhabitants of Mongondu (see *ibid.*, VII, Verh., p. 11, 1875, with figures). After all this, which can be read in detail in my paper, there can be no doubt but that the custom is spread nearly over the whole of Celebes.

As to the Philippine Islands, the case is equally obvious. Thévenot, who wrote in 1664 ("Rel. de divers Voyages," nouv. edition, Vol. I, Paris 1696, p. 6, of the chapter, "Rel. des Isles Philippines"), says: "Ils auoient accoustumé dans quelques-vnes de ces Isles, de mettre entre-deux ais la teste de leurs enfans, quand ils venoient au monde, et la pressoient ainsi, afin qu'elle ne demeura pas ronde, mais qu'elle s'estendit en long; ils luij aplatissoient aussi le front, croyant que c'estoit vn trait de beauté de l'avoir ainsi."



DEFORMED SKULL FROM A CAVE IN MATIPANO, SOUTH MINDANAO.

The accompanying figure, taken from a photograph, of a skull from the west coast of the small island of Matipano, in the Gulf of Davao, South Mindanao, and which Dr. Schadenberg discovered in a cave there, is, besides, as convincing a proof of intentional artificial deformation as is that of an old Peruvian or a flat-head Indian skull.

Dr. Schadenberg alone discovered a dozen and more of these skulls; besides, such were found before by Mr. Marche, Dr. Jagor,

Mr. Montano, and others, from other islands of the Philippine group. Therefore, no further proof is needed that intentional artificial deformation was practised formerly all over the Philippine Islands.

I only wished on this occasion to prove my case for Celebes, Sumatra, and the Philippine Islands, as it would lead me too far to repeat all that I have said concerning other places in the Malay Archipelago. As to Timor and Timor-laut I did not assert an intentional deformation (see pp. 23 and 24), but, on the contrary, have entered fully into the question of unintentional deformation at different parts of my paper.

Legends of the Australian Aborigines.

By Mr. F. C. Urquhart.

No. 1. *How fire was first obtained.*

"A long time ago," so runs the Kulkadone legend, a certain tribe of blacks were gathered together on some of the open downs in North-West Queensland. They had had a very successful day's hunting, and the carcasses of many slain kangaroos lying about the camp bore witness to their skill. The gins were gathering grass, pounding up lily roots, and making all the usual preparations for a night's rest, when a violent thunderstorm broke immediately over the camp. The vivid lightning set fire to the loose dry grass of the downs, which blazed fiercely, scorching and partially roasting some of the dead kangaroos. When the people came to eat these semi-roasted portions, it was universally admitted that the meat in a partially cooked state was a great improvement on the raw flesh which had hitherto been their staple article of food: so an old woman was despatched to follow up the fire, still to be seen blazing on the downs, and to bring some back with her. After some time she returned, bearing a blazing firestick as the witness of the success of her mission. She was then appointed permanent caretaker of the fire and solemnly admonished by the elders of the tribe never to lose it or allow it to go out. For many weary years the old woman faithfully fulfilled her trust, until one fatal night in the wet season, when the camp was swamped with water, her vigilance relaxed, and the dreaded disaster befel the tribe—the fire went out. When daylight broke, no fire was forthcoming, and the old woman was brought up to give an account of her charge. As a punishment for her neglect, she was condemned to wander alone through the bush until she could find the lost fire. Long, says the legend, did she stray about that trackless wilderness in solitude, vainly searching for the lost gift, till, one day while passing through a thick scrub her patience and temper gave way, and by way of venting her rage she broke off two sticks from adjacent trees and rubbed them

violently together. To her astonishment and delight the friction of the sticks produced fire, and she returned to her tribe in triumph with her precious discovery, which has never since been lost by them.

The foregoing story, though very simple, is of value as being a *bonâ fide* aboriginal legend, and it must be admitted that for feasibility it contrasts favourably with the story of Prometheus and other similar mythological legends of ancient history bearing on the same subject.

No. 2. The Immortality of the Soul.

In the year 1882–3, in the course of my duty as a native police officer, I had a great deal to do with a tribe of blacks called "Kwearriburra" on the Lynd River. One of their customs, from the fact that it demonstrates the aboriginal belief in a life after death, is worth preserving and placing on record.

When passing through blacks' country I frequently noticed graves upon which fires had been lighted, and this sight always recalled to my mind passages in Longfellow's "Hiawatha," describing a similar practice as existing among North American Indians, and I was led to inquire whether the Kwearriburras had the same object in view as the red-skinned warriors of Lake Superior, viz., to light the disembodied spirits on their journey to the "Land of the Hereafter."

The result of my inquiries was to show that although the cases are apparently analogous, no real parallel can be drawn between them; for, fantastic as the Red Indian's motives are, those of the Kwearriburras are still more so. The latter hold that, unless strong preventive measures are taken, the spirits of departed members of the tribe rise from their graves and continually haunt and otherwise annoy those who are still in the flesh. Accordingly, elaborate precautions are adopted to keep the unfortunate ghosts confined in the grave which holds their mortal clay. The *modus operandi* is as follows:—

On the death of a member of the tribe, his or her head is cut off and the trunk placed in a grave in the usual squatting position, and covered up. A fire is then lighted on the top, in which the head is roasted; when it is thoroughly charred it is broken up into little bits amongst the hot coals, and the fire is then left to die gradually out. The theory is that the spirit rising from the grave to follow the tribe misses its head, and goes groping about to find it; but being bereft of its head, it is of course blind, and therefore, not being able to see the fire, gets burnt. This frightens it so terribly that it retires into the grave again with all expedition, and never again presumes to attempt a renewal of social intercourse with the human denizens of this world.